MUNICIPAL JOURNAL AND ENGINEER

VOLUME XVIII NEW YORK, JUNE, 1905 No. 6

CIVIC ART IN THE QUAKER CITY

The Utilitarian and Aesthetic Side of Civic Development Demonstrated by the Fairmount Park Art Association of Philadelphia

IN a joking way the city of Philadelphia is often referred to as slow and sleepy, but it is only in jest, for of all American cities none has been more persistent in its efforts to beautify its parks, public buildings and thoroughfares. The laying out of the streets after what was known as the gridiron plan has made the symmetrical and aesthetic development of the city almost impossible. Plans are now under way, backed by a large number of enthusiastic citizens, to rectify this error made by the founders of the city, and with good prospects of success within the next decade. In the meantime, the Fairmount Park Art Association, which has been at work for a third of a century, has accomplished much in the beautification of Fairmount Park, and also promoted public sentiment for the beautification of all public squares and buildings. At the last annual-meeting Mr. John H. Converse, president of the association, briefly outlined in his address what had been accomplished by the organization during its life, as follows:

THE WORK OF THE ASSOCIATION

"Thirty-three years ago a gentleman who has gone to his reward conceived the wise idea that there was an opportunity for civic betterment in the treatment of our beautiful Fairmount Park. He largely devoted his life and his energies to the development of that idea. The results are open and known to you all. The record of the Fairmount Park Art Association rests not only on what it has done in beautifying our park, in enriching our city, but in the precedent which it has set for other similar associations; and without being able to give precise figures I suppose it can be stated that there are hundreds of associations now in different parts of the country which have been modeled after the Fairmount Park Art Association, or at least have been brought into existence under the inspiration of this association. The association has reached one important point, to which it has been looking forward for years; and that is, it has reached and passed the $100,000 figure for what is called a permanent fund. It was voted many years ago that a certain proportion of the annual dues should be set apart for this permanent fund and that they should not be used for any of the purposes of the association; but that the permanent fund, when it reached $100,000, should be available by its income for the work of the association. The permanent part fund is now $109,000 and the city fund $11,000; so that an income in the neighborhood, I suppose, of $5,000 can now be derived from these invested funds; and that income, with the amount coming from the annual dues of members, will enable the association, I believe, to do in the future more and bettter work, even, than it has in the past. It may make it possible within a very short time, now, to accomplish three objects which have been before the association for some time. One is, a statue of the financier of the Revolution, Robert Morris. There is a committee on that subject, and contributions have already been made toward it. Another is a statue of the great inventor, Ericsson, whose career was coincident with the development of railroads in Europe and of the battleships in America. Few of us realize that he built one of the trial locomotives which was run in what was called the Rainhill competition in England in 1827. Subsequently he came to this country, and we all know of the services which he rendered to our government in the War of the Rebellion by monitors which he designed and many of which were built under his supervision. Toward that fund an interested friend has contributed $5,000, and more has been added; so that we may hope in due course that it shall be completed and the work may be put in commission. A third object which was underlined some time ago—a statue of Gen. Mc-

* The text and the illustrations in the thirty-third annual report of the Fairmount Park Art Association are so pertinent and instructive that the editor sought and obtained the permission of the Association, through its secretary, Leslie W. Miller, to use part of the text and some of the illustrations in this article. [EDITOR.

Clellan—also has a start and some contributions have been made toward it; and it is hoped that that also may be accomplished in due course."

At the same meeting Mr. Frederick Law Olmsted, Jr., made an address upon the progress in the development of park systems, using that of Boston as an example, which he described as follows:

The Boston System of Parks

"An examination of the outline maps showing the public open spaces about Boston in 1893, and again in 1900, will bring out several points of importance. Looking down on Boston as from a balloon floating above the ocean to the northeast of the district, we see the city lying in a sort of basin, surrounded on three sides by rocky hills which shelve down into the sea on the east. The basin is cumbered with minor hills, many of which are but great mounds of glacial rubbish. Out into the sea half-submerged ridges and hill-tops, now of rock and now of glacial gravel, make points and islands. Through the middle, the Charles River finds a crooked path to the harbor; from the northwest the Mystic River comes through a gap in the rock-rim of the basin and works its way to the same center, and from the southwest the Neponset River does the same. To the east the ship-channel makes out to sea between the protecting islands.

"Boston, founded on the cluster of hills at the focus of the basin, has spread wherever the topography favored; but building has perforce avoided the low river banks, the steep and rocky hill barriers, the salt marshes, and certain exposed shores along the coast. Accordingly when the people awoke to the need of permanently reserving an outer park system they found good opportunities for securing vacant lands among the wooded rock-hills, along the river banks and on the seashores.

"In the opportunity for thus obtaining vacant and low-priced lands distributed with admirable symmetry all about the center of development and flanking all the radiating lines of travel, Boston has had an advantage for securing a well-planned park system far more than offsetting the difficulties imposed by the sub-divided municipal control of the area.

The Commercial Side of Park Development

"The economic principle of setting apart for park purposes those regions least adapted for building purposes is a sound one, and such regions often have a peculiarly picturesque or interesting topography that renders them highly valuable as parks; but it is not every city that has such naturally defended park regions equitably distributed or in such quantity as to supply the needs of the community. Clearly, around a flat and uniform city like Chicago park areas will not define or even suggest themselves, and, if any parks are to be kept open, good building land must be

THE ARNO AT FLORENCE (1)

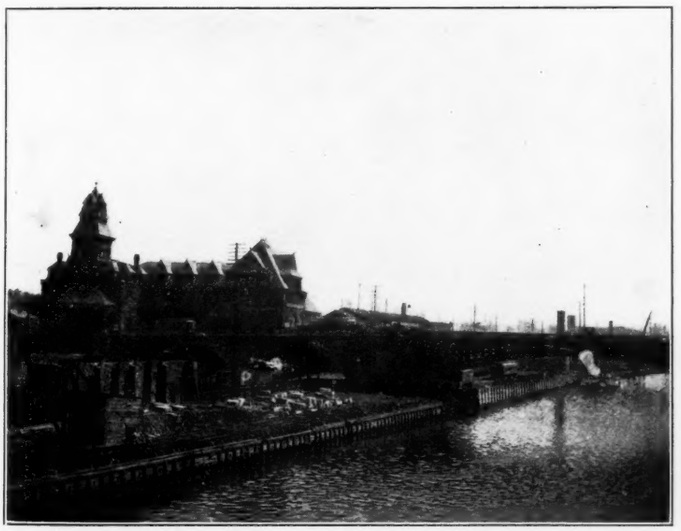
THE SCHUYLKILL AT PHILADELPHIA (1)

A SMALL PARK IN A LARGE CITY (2)

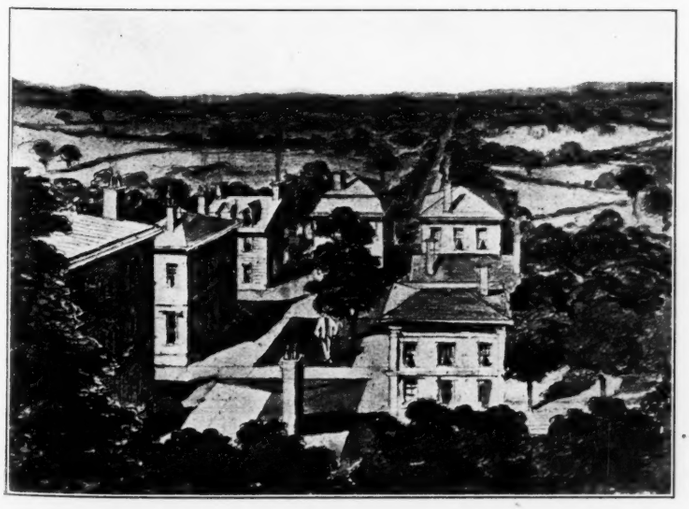
(1) The topography of these two localities is almost identical and the river-banks in the lower view that are now abandoned to ignoble and unprofitable uses are easily susceptible of treatment that would make them quite as attractive as those of the Italian city.

(2) The relative importance of a breathing place to a man in a large city and to a man in a small town is shown graphically by these sketches. A man in the small town has the open fields near at hand, and his village square may be small without injury to his health or happiness. The man in the large city has miles of paved streets and brick blocks to pass through before he comes to the open. His park should be large enough to give the restful feeling of the country, and near enough to let his wife and children visit it.

THE THAMES EMBANKMENT, LONDON (1)



THE SCHUYLKILL AT CHESTNUT STREET BRIDGE, PHILADELPHIA (1)



A SMALL PARK IN A SMALL TOWN. (SEE 2, P. 252)

deliberately set apart and sacrificed to that end. The region around Philadelphia occupies topographically an intermediate position, certain strips and spots, like the Valley of the Wissahickon, Pennypack, Cobb's, Tacony and Mill Creeks, clearly putting themselves forward as better adapted for park use than for building, while most of the other land can be without undue expense converted into building lots, and is therefore bound to be so used unless arbitrarily reserved long in advance of the actual need of parks in a given region.

"In addition to the equitable distribution of the reservations there is another feature brought out more clearly by a larger map, which entitles the Boston Metropolitan parks to be called a System, and it is a feature which fairly distinguishes the modern attitude toward outer parks from the more hap-hazard methods of selecting them which prevailed during the previous generations. I refer to the connection of many of the reservations with each other and with centers of population by means of parkways, sometimes no more than broad and tree-lined streets or wider formal boulevards, and sometimes in effect elongated parks following a stream or other natural landscape feature. The functions of such parkways are threefold: they provide widely distributed park spaces, narrow enough not to seriously interrupt or interfere with the ordinary occupation of city territory, but sufficient to adorn it and to meet various local uses; they make it possible to use two parks as one by affording a sort of Siamese connection; and by extending their arms of park toward the various centers of population they shorten the average length of travel to and from the parks through the ordinary city streets. Since the prime function of large parks is to refresh people by the relief which they afford from just those conditions of hurry and worry and jostling nervous activity which characterizes the life of the ordinary city streets, it is a serious impairment of their value to isolate them from the mass of the people by miles of just such streets through which they must pass in going and returning, wearing off in the passage much of the peace of mind and nerves which they may have derived from the quiet restfulness of the park itself.

"If, as we are forced to conclude, there is to be no limit to the growth of our urban centers, every city as it grows must keep acquiring outer parks, to be in turn embedded by the extension of the city and become the inner parks of the future. There can be no doubt of this general conclusion, but the interesting and vital question for each city is how fast to acquire such parks and to what extent.

Development of Parks in Other Cities

"If we seek a gauge in the opinion of the people as expressed in their actions, we observe that a general acitvity in securing such parks far in advance of the tide of population has followed in many parts of the country upon the example set by Boston. Active steps have been taken by cities as widely scattered as Providence, R. I., and Seattle, Wash., Baltimore and Ottawa, San Francisco and Newark, while in the Middle West similar developments are general, from Chicago and Milwaukee to Kansas City, and north again to

(1) The relation of these two localities to the centers of population and business activity is practically the same.

Minneapolis and St. Paul. Philadelphia, I regret to say, is conspicuous by its official absence from the list, although your agitation seems likely to secure results before long.

"If we are to be more definite in our comparison we must look to the ratio between population and park area.

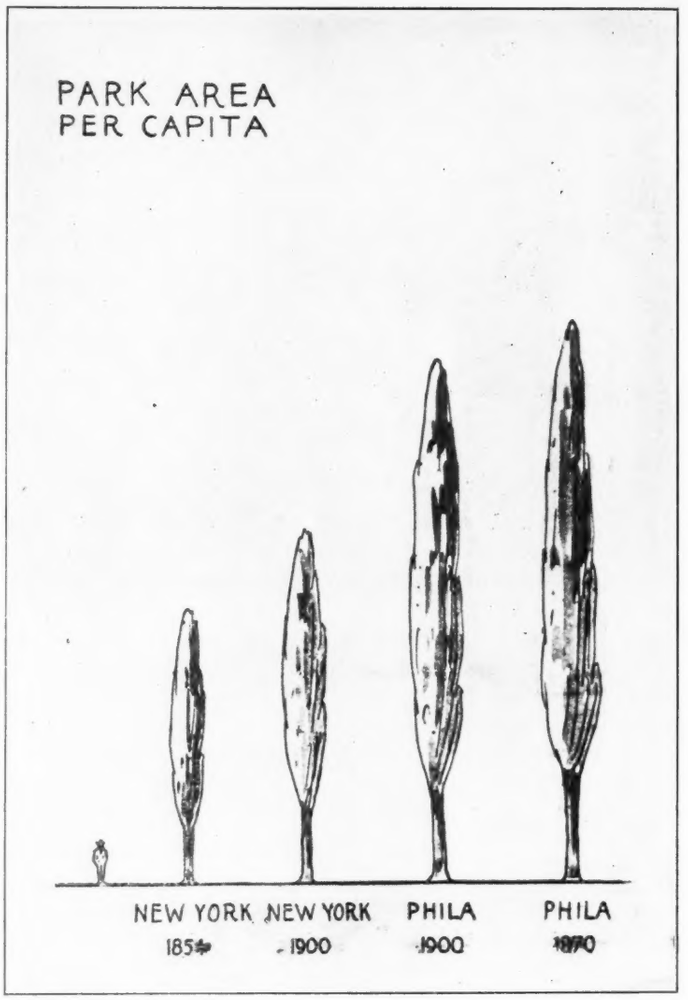
"Philadelphia and Boston, drawn to the same scale, with the park areas shown in blank, offer a striking comparison, but the relative meagerness of the Philadelphia parks become more manifest on camparing the population of the two places, as indicated by the size of their respective circles. On the Boston map the inner ring represents the population within the municipal limits, but the larger circle represents the population of all the thirty-nine cities and towns that go to make up the Metropolitan District, and even that total is considerably short of the population of Philadelphia.

"Greater New York, if we include Newark and the Oranges as a part of the metropolis, affords an interesting comparison with Philadelphia as regards the extent of its park areas and the approach to a systematic distribution of them, although the size of the population is such that the showing per capita is not so striking. Since this New York map was drawn a strong movement has come to the fore to secure a large seashore reservation at or near Coney Island, and there is every prospect that this object will soon be attained.

London Compared with Philadelphia

"The comparison of London with Philadelphia is interesting, because in London we have the result of a wholly unplanned growth and a collection of public open spaces very few of which were secured by deliberate municipal action. Just as Boston was assisted by the peculiarities of its topography which delayed the spread of buildings into certain areas until the community awoke to the need of holding them permanently open, so London has been assisted by certain peculiarities of mediaeval land tenure by which, through a blind conservatism rather than through any foresight, the people have continued for centuries to withhold from productive occupation great numbers of uncultivated and almost unused commons or 'wastes,' and also certain ancient royal hunting grounds, with the result that as London has spread over and absorbed village after village, the old commons have remained as public open spaces, and still beyond the limits of the present vast population other such 'outer parks' exist, although in the absence of a well-planned distribution we cannot say that there is any outer system.

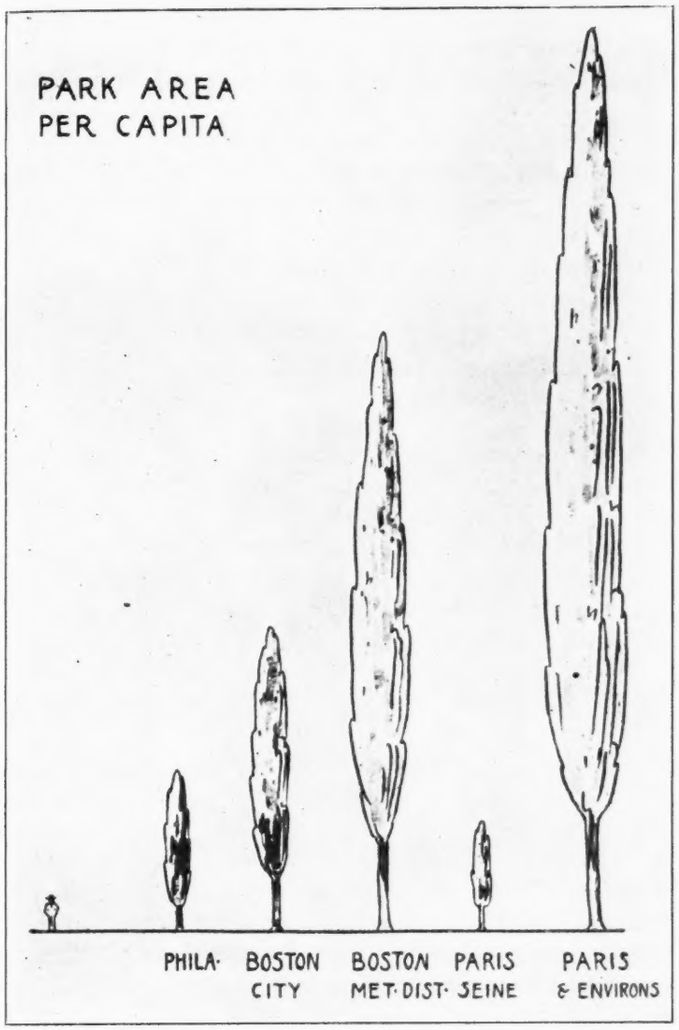
"Around Paris similar causes have led to the unplanned provision of a great reserve of public open spaces, in this case mostly national property, the remains of the royal domains of the past. Greatly as the population of Paris still exceeds that of Philadelphia, the provision of park areas far more than outweighs it. And the striking feature about the comparison is the abundance of outer parks about Paris, and the almost complete absence of outer parks about Philadelphia. Paris is growing into a region better provided with parks than the present city, while Philadelphia is growing into a region in which neither the peculiarities of the topography nor the inheritance of a feudal past has fixed any limits to the uninterrupted spread of brick and mortar.



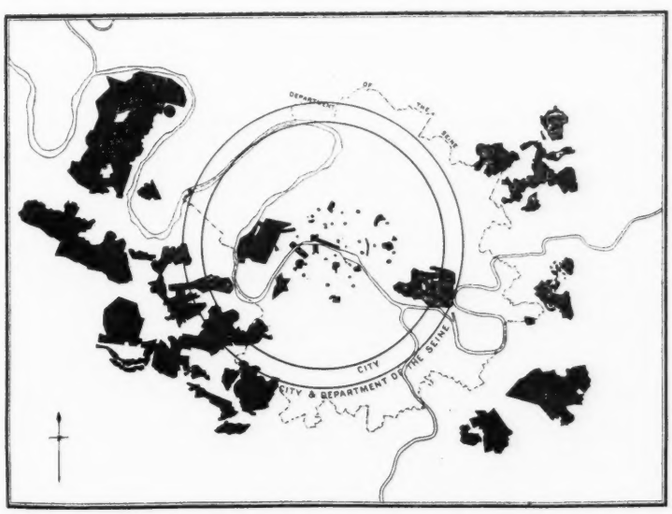
The park area per inhabitant in each case is shown by the height of the trees. New York is given for 1854, just after the acquisition of Central Park, and for 1900. An increase of park area per inhabitant is shown. Philadelphia is given for 1870, after the acquisition of most of Fairmount Park, and for 1900. A decrease in park area per inhabitant is shown.

PARK AREAS OF LONDON

For comparison, the population of the city (31,083) is indicated by the inner circle, and the population of the county (4,433,018) by the outer circle, on the assumed scale of 20,000 people to the square mile.



The park area per inhabitant in each case is indicated by the height of the tree. The park area even for the city of Boston is largely in excess of Philadelphia, while that of the Boston Metropolitan District is enormously greater. In Paris the city shows less park area per inhabitant than Philadelphia, but the Department of the Seine has even more park area per inhabitant than the Metropolitan district of Boston.



PARK AREAS OF PARIS

For comparison, the population of the city (2,511,629) is indicated by the inner circle, and the population of the Department of the Seine (3,308,007) by the outer circle, on the assumed scale of 20,000 people to the square mile.

"If you are to have such reservations you must make them deliberately, and pay for them out of the wealth which an otherwise unemcumbered land will bring you in.

"It has been stated in connection with the Philadelphia Parkway project that if Fairmount Park were extended to the city by an adequate connection, such as that proposed, so as to bring it into a relation with the city comparable with that of the Bois de Vincennes and Bois de Boulogne to Paris, a comparison of the park areas and populations would show Paris to have 'an acre of park for 495 people and Philadelphia an acre to about 300 of population,' or, to put it in other words, that Paris has only 88 square feet of park to each man, woman and child, while Philadelphia has about 145 square feet. This conclusion, however, appears to be based upon figures which credit Paris only with those parks lying within the boundary of the Department of the Seine—within the county line, so to speak—whereas practically the whole of the outer park systems of Paris lies outside of that arbitrary boundary.

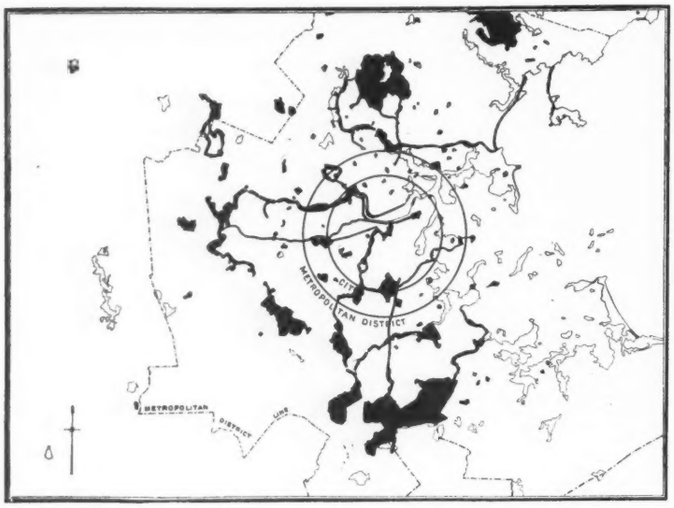
The Ratio of Park Area.

"For the purpose of showing more clearly the ratio of park area to population, I have prepared a couple of diagrams. The first of these shows by the height of the trees the amount of park area per capita in 1900 in Philadelphia, Boston and Paris. To avoid misunderstanding, I have reckoned the ratio for Boston and Paris first for the central portion only, that is to say, in the case of Paris reckoning only those parks which lie within the boundaries of the Department of the Seine, and in the case of Boston reckoning only those parks that lie within the city limits, comparing with each the population within the same boundaries; and, second, I have compared the area of all the park area available for each community, as shown on the maps just presented, with the total population.

"The lesson of the diagram is the same at that of the maps. Even if Philadelphia is thought to have a reasonable area of parks in proportion to the region already occupied by houses, it has absolutely no reserve to provide for the constant spread of streets, buildings and people into new territory. Philadelphia's position is that of a city which would say 'My growth and greatness lie in the past. I have reached my limit and will grow no more.'

"The second diagram shows by the height of the trees the amount of park area per capita at two periods in Philadelphia and in New York, confining New York, for the sake of comparison, to the old city limits, including Manhattan and the Bronx. It is apparent that New York has now a somewhat greater park area per capita than in 1854, after the acquisition of Central Park. For thirty-four years, with some fluctuations, the allowance of parks in proportion to the people got steadily smaller, till the large park purchases in 1888 suddenly brought it up to such a point that the growth of population has only just begun to balance this increase and has nearly restored the original ratio. In Philadelphia the balance of spasmodic park growth and steady increase in population shows an actual shrinkage in the park area per capita for the twenty-year census period. It is true that the shrinkage is not great, and in spite of the mortifying comparison with Boston and Paris, it might seem

upon the surface of it reasonably satisfactory for the city to have maintained substantially the per capita allowance of park area which was thought sufficient in 1870.



PARK AREAS OF BOSTON

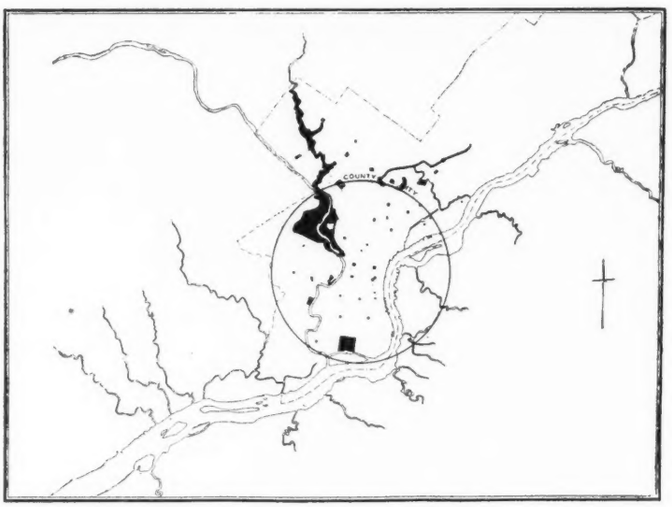
For comparison, the population of the city (560,892) is indicated by the inner circle, and the population of the Metropolitan District (1,164,957) by the outer circle, on the assumed scale of 20,000 people to the square mile.

"I believe, on the contrary, that a per capita allowance of park area which is adequate for a small city is by no means sufficient for a large city.

"In a small city a given amount of park area for a given unit of the population may supply every need of town decoration, provide for playgrounds, band concerts and the like, and amply fulfil the needs of the people, who can get out into the fields for an afternoon's tramp or a Sunday picnic in the course of half an hour's walk or ten minutes in the trolley cars.

"But surround that community, with the same population and the same park area, by an agglomeration of other similar urban communities extending miles in every direction; push the country so far away that the great mass of people can never find the time nor the price of reaching it; and then consider whether the park area per capita which is reasonable for a small city will adequately fill the needs of a great metropolis.

"As long as a city continues to grow, so long must it keep increasing its park area, and not only must the park area be increased, but it must grow at a faster rate than the population, for the people inevitably become more and more dependent upon it for that recreation upon which their health and efficiency depends."



PARK AREAS OF PHILADELPHIA

For comparison, the population of the city and the county (1,293,697) is indicated by a circle on the assumed scale of 20,000 people to the square mile.

TWO-CENT CAR FARES IN ENGLAND*

In consular reports from England, and in newspaper and magazine articles written by the many Americans who tour this country for the purpose of investigating municipal systems, there are frequent references to 2-cent street-car fares in England, but I have not seen in any of the writings a clear statement of what is meant by a 2-cent street-car fare.

The average distance one can travel in Birmingham for 2 cents is 1 mile 2 furlongs and 158 yards. The minimum "penny stage" (2-cent distance) is 6 furlongs and 189 yards and the longest penny stage 2 miles and 178 yards. When the leases of the present street-car lines (cable and steam trams and a couple of electric lines) have expired, and Birmingham is in a position to build and conduct an electrical street railway system—and it will be fully 1907 before there can be anything like a complete system—the penny or 2-cent stages will not extend over 2 miles.

It has always seemed to me that street-car travelers who can afford to take short rides are the ones who can afford to pay full fares. The penny (2 cent) system of charges for a given distance, and between arbitrary points, offers transit facilities of a less accommodating, because less flexible, character to the average street-car user, as compared with a single fare of 5 cents for any distance. It favors those residing near one of the termini or "penny stages" and any of the public who happen to be near a "penny stage" when wishing to use a street car, and particularly when the needs are to go to a point near a terminus or "penny stage." The system also practically excludes the adoption of the transfer system, a facility so much appreciated by street-car users in the United States. If a person's business place is 25 yards from a "penny stage" and his home 20 yards beyond the next "penny stage," and he wishes to ride all the way home, and the "penny stage" is 2 miles, which will be the maximum stage of the new systems in Birmingham, the street-car fare would be 6 cents for 2 miles and 45 yards.

* *From United States Consul Halstead, Birmingham, England.*

CITY MADE CHARTERS*

A Study in Municipal Home Rule—Its Origin and Development as Given by an Expert—Concluded

By Milo Roy Maltbie, Ph.D.

MILO ROY MALTBIE

STATE FUNCTIONS

IN the first place, it is generally admitted that police administration is not a local matter, and although a charter may deal with police matters in absence of State law and when not conflicting therewith, yet in case of conflict the State law always takes precedence and may go so far as to take the administration entirely out of the hands of the city and vest it in a board appointed by and responsible to the Governor.[1] This has been the situation in St. Louis for a generation. The local judiciary is in much the same position, and the tendency is to include even the purely local courts, such as police courts and courts for the trial of petty offenses or the enforcement of local ordinances.[2]

Other subjects held *not* to be local matters are the conduct of elections and the registration of voters,[3] the duties, powers, methods of election, etc., of county officers, such as constables, sheriffs, court clerks, etc.,[4] educational administration,[5] the alteration of city boundaries,[6] and the limitation of municipal indebtedness.[7] In all these matters, State laws supersede municipal charters.

MUNICIPAL AFFAIRS

The courts have upheld charter provisions dealing with the following matters: The taxing of lawyers $25.00 per annum (no specific grant of authority necessary, the court said),[8] park administration,[9] method of presenting and allowing or disallowing claims against a city,[10] manner of assessing damages and benefits in the grading and repaving of streets,[1] salaries of police and firemen,[2] the condemnation of lands for park and boulevard purposes,[3] the licensing of business and especially liquor dealers solely for revenue.[4] The decision in this last case was directly to the point. The charter of Los Angeles gave to the council the power to regulate, tax, etc., liquor dealers. An ordinance was duly passed, the sole object of which was the raising of revenue; a tax of $60 per month was levied. The legislature, subsequent to its approval of the Los Angeles charter but prior to the passage of the ordinance, passed an act taking from the cities the power to tax except as incidental to regulation. The conflict between the charter and general State law was plain, and the court decided that in Los Angeles the State law was without effect, being set aside by the ordinance relating to a municipal function. One judge said: "The people of this State, moved by a temporary impulse (not yet entirely abated) to carry the notion of what is called 'local self-government' to extremes have taken away from the State an important part of that peculiar attribute of sovereignty, the taxing power * * * ," Nevertheless, he did not question the decision, although two other judges dissented.

The principle is well established in these matters and in all others which may be termed municipal, that in case of conflict a freeholders charter supersedes a general law. It is also true that in case a charter is silent, a general act upon the subject will govern as if it were a charter provision.[5] But all a city needs to do to free itself from the general law is to amend its charter by incorporating such provisions as it wishes to enforce.

The attitude of the courts in declaring judicial, educational, police, and electoral matters of State interest, and therefore beyond the exclusive jurisdiction of home rule charters did not please the Californians, and in 1896 still another amendment was added to the constitution—Section 8½ of Article XI. This empowers a charter to provide for the constitution, regulation, government, and jurisdiction of police courts, for the method of selecting judges, their terms and salaries, and the compensation of their clerks and attaches; for members of boards of education, of police and of election commissioners and their terms of office; and for the organization, regulation, and compensation of police departments, election bureaus, and county officials where a city and county have been consolidated. No other State has gone so far, and consequently the cities of California

---

* Since this article first appeared in the *Yale Review* the Constitutional Home Rule committee of New York City has been formed with the following gentlemen as officers: John G. Agar, president Herman A. Metz, vice-president; Milo R. Maltbie, secretary. As stated in the constitution of the committee: "The objects of the committee shall be the promotion in the City of New York of the cause of home rule for the cities of the State by constitutional amendment, and the encouragement of the organization and co-operation of similar committees throughout the State."—[EDITOR.

[1] *Ewing vs. Hoblitzelle*, 85 Mo. 64; *State vs. Police Commissioners*, 71 S. W. Rep. 215; *State vs. Mason*, 153 Mo. 23.

[2] See opinions of the courts in *People vs. Toal*, 85 Cal. 333; *Miner vs. Justices Court*, 121 Cal. 264; *Ex Parte Loving*, 178 Mo. 194. A strong dissenting opinion is given in the first case.

[3] *Ewing vs. Hoblitzelle*, 85 Mo. 64; *Fragley vs. Phelan*, 126 Cal. 383.

[4] *State vs. McKee*, 69 Mo. 504; *State vs. Finn*, 8 Mo. App. 341; *Crowley vs. Freud*, 132 Cal. 441.

[5] *Kennedy vs. Miller*, 97 Cal. 430.

[6] *People vs. Coronado*, 100 Cal. 571; *State vs. Warner*, 4 Wash. 773; *People vs. Oakland*, 123 Cal. 604. The Missouri courts do not quite agree, for in the case of *City of Westport vs. Kansas City*, it was decided that when the boundaries of a city are fixed in a home rule charter, a change must be considered as an amendment to the charter. This case is not quite on all fours with the others, and one cannot say that there is a direct conflict. See also *Kansas City vs. Stegmiller*, 52 S. W. Rep. 723.

[7] *Beck vs. St. Paul*, 87 Minn 381.

[8] *St. Louis vs. Sternberg*, 69 Mo. 289; also *Kansas City vs. Lorber*, 64 Mo. App. 604.

[9] *Kansas City vs. Bacon*, 147 Mo. 259; *Kansas City vs. Scarritt*, 127 Mo. 642.

[10] *State vs. District Court of St. Louis Co.*, 90 Minn. 457.

---

[1] *State vs. Field*, 99 Mo. 352.

[2] *Popper vs. Broderick*, 123 Cal. 756; *Ex Parte Helm*, 143 Cal. 553.

[3] *Kansas City vs. Marsh Oil Co.*, 140 Mo. 458.

[4] *Ex Parte Braun*, 141 Cal. 204.

[5] *Fragley vs. Phelan*, 126 Cal. 383.

have practically the highest degree of home rule to be found anywhere in the United States. Theoretically, the legislature may veto any charter which transcends reasonable bounds, and this veto might become a very effective check upon local action, but so far as it has not been used or needed. Its existence has to some extent been considered a justification for the granting of such wide powers of home rule.

Method of Amendment

Every constitution specifies the manner in which a city-made charter may be amended. In the States of Missouri, California, and Washington, the law-making authorities of the cities have the power of initiation. In Minnesota, the permanent charter board may originate, and upon petition of 5 per cent of the legal voters, it *must* submit the amendments petitioned for to popular vote. The constitution of Colorado provides for popular initiative (5 per cent. of the voters) as a method of amending a freeholders charter; the council *must* submit when so petitioned. A Washington statute provides for a referendum upon proposed amendment when 15 per cent. of the voters petition.[1] This seems to be the tendency generally.

In every State, the proposed amendements must be submitted to and accepted by the people before taking effect. A three-fifths vote is necessary in Missouri and Minnesota, but only a majority in California, Colorado, and Washington. The vote may be taken at a general or a special election in Missouri, California, Minnesota, and Washington. If the petition is signed by more than 10 per cent. of the voters in Colorado, a special election may be held, otherwise not. Intervals of not less than two years must elapse between the submission of amendments in California and St. Louis, and in Colorado the same amendment may not be voted upon oftener than once in two years. In other States, no such limitations exist.

The earlier constitutions were silent regarding the calling of a second charter convention when once a freeholders charter had taken effect. Not until 1900 did the question come before the courts of California for adjudication, when it was decided in the case of *Blanchard vs. Hartwell*, 131 Cal., 263, that the substitution of a new charter for the old was a method of amendment and that the California Constitution did not provide for amendment by a convention of freeholders. Apparently there is need for another constitutional amendment. One has already been adopted for St. Louis, and the city may adopt a new charter whenever and as often as a charter board of freeholders is elected. In the case of *Reeves vs. Anderson*, 13 Wash., 17, the Washington courts gave a different answer to the question and declared that the right of a city to draft its own charter is a continuing right and that the power is not exhausted when once exercised.

The Colorado Constitution applies the same provisions to a proposal for a charter convention as to an ordinary amendment, and in Minnesota the natural interpretation would be (the question has never been before the courts) that the permanent board of freeholders has power to draft an entirely new charter as well as to amend the one they previously have prepared.

[1] Chapter 186 of the Laws of 1903.

Charters Adopted and Rejected

The cities of the Western States have taken generous advantage of their home rule privileges, as indicated by the following table:

State.	Constitutional provision adopted in	No. of cities eligible.	No. of cities having freeholders charter.	Remarks.
Missouri	1875	3	2	St. Joseph has only recently attained sufficient population.
California	1879	28	18	Under discussion in five others.
Washington	1889	3	3	(?)
Minnesota	1896	53	11	At least.
Colorado	1902	16	1	Denver.

These numbers promise to increase yearly, for when a legislative charter is outgrown and a new one needed, a freeholders charter is generally drafted in preference to incorporation under a general law.

Besides the cities enumerated above, others have elected conventions and submitted charters to the people which have been rejected. Indeed rejection is not uncommon, and in a few instances successive drafts have been disapproved. San Francisco did not ratify a freeholders charter until 1898, four drafts previously voted upon having been rejected. Four have failed of adoption in Minneapolis and at least one in a score of other cities.

The reasons assigned are various. Here it is a provision regarding liquor licenses, there too little or too much power given to the Mayor. In other instances the fear of an increased tax-rate, opposition to "labor clauses," distrust of radical tendencies, opposition to extreme conservatism, reluctance of the "machine" to part with its control of the city, etc. The most common cause is apathy; a sufficient number do not cast their ballots to secure the required majority. Generally, the vote upon the charter ranges from one-fourth of the entire vote, except possibly where an important matter is at issue. This is sometimes urged as an objection to the plan, and it is declared that acceptance or rejection is not infrequently determined by those who are interested from selfish motives. Doubtless this is sometimes true, but no other plan has yet been devised which is productive of better results upon the whole.

General Satisfaction with Home Rule Plan

This scheme for municipal home rule seems to satisfy fully the cities that are working under it. Objections are raised to this or that detail, and not infrequently some minor change is advocated, but the fundamental principle is generally satisfactory. The vote upon amendments to the constitution has shown considerable opposition, but usually less than one-third of the total vote on the amendments, and I know of no instance where they have been defeated at the polls. Generally, the opposition comes principally from the rural districts, which distrust the ability of the cities to govern themselves, are reluctant to surrender their control and are fearful of a campaign of retaliation. When once adopted, however, the number of opponents rapidly decreases, and in cities themselves it is very small. In no State is it proposed to repeal the home rule provision and to return to the lees and husks of legislative rule. It is possible that the people are mistaken and that their present condition is worse than

their first, but it is undisputed that the cities having freeholders charters are satisfied with the general scheme of home rule.

Beneficial Results

The character of the charters adopted seems to justify this view. The statement is frequently made by persons who have lived in various cities and have had an opportunity to compare freeholders charters with legislative charters that the former are noticeably better, that they more nearly conform to the best principles of political science, have greater unity and consistency, are better adapted to the needs of the locality, respond more quickly to local changes, etc. My own investigation confirms this statement, but there have been exceptions. The champions of home rule do not claim that it has wrought a revolution in city administration or has brought the millennium. Municipal corruption has existed in St. Louis even under its freeholders charter. But political corruption has its source back of charters; they may assist, but they rarely cause it. However, a good charter is an aid to good government, and so far as it is—often immeasurably so—the system of home rule we are discussing has contributed its share.

The long period in which it has been tested and the varying circumstances under which it has been tried seem to indicate that its beneficial results are permanent and not transitory. It is founded on certain fundamental principles which are thoroughly sound. In the first place, the system fixes responsibility. Under legislative charters, the city excuses itself for every misdeed, saying that as it does not make its own laws, it cannot be held accountable, and that the fault lies with the legislature. The legislature replies that the city is to blame. When a city makes its own charter, such shilly-shallying is impossible. If its government is at fault, it has the exclusive power to remodel it, and it cannot shift the burden to another's shoulders. It makes its own bed, and it must lie in it—a theorem which conduces to the selection of a better bed.

Responsibility is not only focalized but localized. State administration of municipal matters may centralize and definitely fix responsibility, but the persons in authority are out of reach. They are not elected by the locality and they can neither be punished by it for mal-administration nor rewarded for efficiency—a condition which leads to indifference, to laxity, and often to corruption. Under home rule, the conditions are exactly reversed. The officials are near at hand where they may be watched, every act made known, misdeeds punished, and efficiency rewarded. This applies with great force to charter-making, and the satisfactory character of freeholders charters is largely due to the localization of responsibility.

Home rule has also an educational value. The boy never learns to swim who refuses to enter the water. The city never learns to administer its affairs by being governed from the State capitol. Left to themselves, these Western cities have made experiments and acquired valuable experience. They have adopted many ideas which are new to municipal administration; some have failed and some have succeeded; but the lessons have been well learned and the cities are the wiser and stronger.

The concentration of power has a stimulating as well as sobering effect. When legislative interference is removed, the city not only says, we are thrown upon our own resources and must take more care, but also, here now is our opportunity to achieve results; the State has expressed belief in our ability to govern ourselves; we will not disappoint it. Having the power to accomplish something and seeing at last the impossibility of having one's efforts set aside by outside interference, men of ability and civic patriotism come to the fore.

This, after all, is the immediate cause of the beneficial results, for if good men are not elected as members of charter conventions, good charters will not be drafted. There have been exceptions, but, generally speaking, delegates to freeholders conventions have been selected from among the best men of the city. Party lines have been broken down and nominations made independent of party, or the best men of each party placed upon a union ticket. In elections, too, party lines have not been followed. Naturally, the men selected have been of a high type, a higher type than the members of the legislature. They have been chosen for a special purpose and with their special qualifications for this work in mind. The importance of the duty to be performed has made the selection of the best men imperative, and in turn it has attracted them, just as a constitutional convention attracts the ablest men of the State. Further, a charter convention gives its whole attention to one subject and not to a multitude of unrelated topics. Every point is given careful consideration, both within and without the convention.

The States have benefited as well as the cities. By the removal of local matters from the jurisdiction of the legislature, special legislation has greatly been reduced. For several years prior to the adoption of the constitution of 1879, the legislature of California passed from 1,000 to 1,200 acts at each session. In the session of 1903, only 385 were enacted (for many years the number has not risen above 300) and of these only 19 related to city affairs. This decrease is not wholly due to the provisions for city-made charters, but in part to the general prohibition against special legislation of many kinds. But without the scheme authorizing each city to make its own charter, there would have continued to be a large number of local acts in one form or another, if we may judge from the experience of other States where they have adopted the prohibition against special legislation, but have not provided for the formation of charters by the cities themselves.

Primarily the city has benefited by this decrease in legislative interference, but not less than the State. It is now possible for legislators to give their full time and attention to matters of general interest. Heretofore, local matters absorbed most of the session. As each member was continuously busy log-rolling on some local measure, he had little time for bills of broad character and general concern. It is unjust to blame the men themselves too severely, for their constitutents and the local politicians besieged them constantly. If they rebelled or were indifferent, they were not re-elected. The locality was not wholly at fault either, for to secure the kind of government wanted, it was necessary to go to the legislature; there was no power vested in the city. The root of the evil was in the lack of home rule,

and when it was granted, the legislature was free to do the work for which it was intended, viz., to enact general laws for the interest of the whole State.

The Fundamental Principle

In principle the system in vogue in these western States is not new. In our early history the drafting of charters by the cities themselves through some well recognized local agency, such as the common council or a specially selected charter committee or convention, was the customary plan. Even in New York, where the legislature at such an early date assumed the prerogative of enacting numerous laws relating to purely local affairs, it was a well recognized principle until well into the last century, that a law altering the charter should not be passed when opposed by the city.[1] Even later the principal acts that were passed without first seeking local approval were acts conferring power upon the city rather than restricting its functions. The last charter convention in New York was held in 1846, and the method it suggested for charter amendments—proposals to be approved by a two-thirds vote of the members of each branch of the bicameral council and afterwards ratified by the people—was almost identical with the method provided a generation later in the home rule scheme of Missouri.

In the States which have suffered least from the evils of special legislation, the legislature has confined it activities to the enactment of very brief and general laws specifying in general terms only the principal features of municipal charters, leaving to the cities themselves the privilege of filling in the details and of altering them as local conditions changed. England, which is looked upon as the home of self-government, has pursued a similar course; and in France the cities likewise have been given wide discretionary powers.

The practical difference between the "freeholders charters" provided for in these five western States and this system is small. In each, matters of State interest are reserved to the central government. To the cities there is also reserved full power to deal with municipal matters in their own way. The principal difference is that under the English and French systems and the plan of enacting only very general laws, the legislative authority *may* interfere at any time and deprive the cities of all autonomy; while under constitutional home rule a field of municipal activity is set apart into which the State authorities *may not* come. It is merely the crystallization into constitutional law of the best practice in the United States and Europe—a crystallization that has been found to be necessary to protect the rights of cities against the encroachments of the State legislature.[1] In no country is the city made absolutely independent, but where some sort of control is necessary, administrative control has been substituted for legislative interference to the great benefit of all concerned. The recent tendency in the United States is in the same direction.[2]

[1] Kent, *Charter and Notes*, p. 235-6.

[1] The Supreme Court of Missouri has said (*Kansas City vs. Marsh*, 140 Mo. 458), and the courts of the other States have endorsed it: "Such a right is entirely in accord with the genius of our institutions, bringing the regulation and government of local affairs within the observation of those who are to be affected thereby, and at the same time preventing the officious and selfish intermeddling with the charters of our cities without the knowledge of those whose rights are affected."

[2] Cf. Goodnow, *Municipal Problems*.

The End.

CITY GOVERNMENT BY COMMISSIONS*

But if the various duties and responsibilities of the city officials are parceled out to commissions, how, one might ask, are pride and interest in civic affairs to be maintained? As far as the effect upon the average citizen is concerned, why is it not as if a town were annexed to a great city? There is, of course, some danger of diminution of public spirit, but it is not so great as would at first sight appear. Interest in municipal affairs in the towns and cities in the Massachusetts metropolitan districts has not degenerated in the least because three governmental departments have been transformed from city officers to State commissions. It is very doubtful whether it would slacken perceptibly if three more were transferred in the same way. There are plenty of problems and duties left. The question of the final disposition of sewerage is settled, but the local sewerage system is not affected. The source of the water-supply is determined, but the transmission to the consumer is a matter for the city. Scarcely any government function, as opposed to the charge of a public utility, is affected, except that the tax rate is fixed by the fact that contributions by the city to the district are certain, and there is, therefore, no opportunity for extravagance one year and enforced retrenchment the next. Above all and beyond all, the town is still a town, not a ward or a borough, a town with a history and a future, a division of the State, not of a city. If it has gone into a partnership or trust with other towns and cities in the water and sewerage business, it has done so of its own free will because it has believed that this course meant good economy, just as it might have decided to sell out a municipal gas business to a private company or to buy its winter's coal jointly with another city.

There is, however, one qualification to be made concerning the govenment of cities by commissions. The final control of the affairs of the district must be not in the State, but in the people of the district. The appointment of the commissioners, the amount of money to be spent, the theory upon which the division of costs between the municipalities is based—these are now in Massachusetts within the control of the Legislature or delegated by it to the governor. A metropolitan park system in which the final determination of the question whether there shall be a new bath-house is dependent on the votes of members of the Legislature from another part of the State is unjust and unreasonable. It is on account of this feature of the commissions that the mayor of Boston and the officials of the other large cities in the district want to be let alone.

* By W. Rodman Peabody in the April-June *Forum*.

COMBINED PLANTS FOR SMALL TOWNS

An Expert Shows How Water and Electric Lighting Plants Can Be Worked Together to Advantage in Small Towns

*By Oscar Claussen**

THERE are four public utilities that have become pre-eminently a necessity for the comfort and health of the citizens of our smaller communities throughout the United States. These are water supply for domestic and fire protection, sewerage, lighting and telephones and their relative desirability in a community is designated in the order mentioned.

Experience, however, demonstrates that this order of desirability is not maintained by our smaller municipalities, at least not in the northwest. Ordinarily telephones come first and undoubtedly owing to their comparatively small first cost are installed by private enterprise. Telephones are followed by water-works, then lighting plants and lastly sewerage.

The largest benefits for the health and comfort of a community will be derived from a water-works and sewerage system, but not from a business standpoint. In fact these two should always go together, as one without the other leaves each with incomplete functions. Inasmuch as their combination insures only very meager monetary returns this probably accounts for the fact that governing bodies and citizens in small towns turn to a more desirable proposition from a business standpoint, being either a lighting plant alone or a combined water-works and lighting plant. This latter combination in almost all cases is sure to give good monetary returns which accounts largely for its popularity.

A lighting plant in a town of 800 inhabitants and above is always self-supporting, provided the rates are not too low, but operated in connection with a water-works system, the combined plant becomes an attractive proposition both from the standpoint of health and comfort as well as business. Convenience, sanitation, safety from fire, reliability of operation and superiority of light dictate almost in every case to prefer electric lighting to gas lighting and the remarks made in the following refer to electric lighting only.

All the remarks made above apply equally to private or municipal ownership.

Taking up now the subject of a combined water-works and electric light plant in detail for a small municipality the first questions that will suggest themselves are: What kind of a plant is wanted? What will it cost? Will it pay? Naturally the proper answering of these questions will depend on local conditions, such as size of town, nature of soil, nature of location of water (lake, springs, rivers, creeks or wells), cost of fuel, market price of construction material and machinery and labor. Making comparisons with neighboring towns will, of course, give some idea, but the best results usually will be of little value and indefinite. Even if similar conditions prevail, there are so many items making up the total plant that a clear idea can not be gotten by comparison inasmuch as there is an immense difference between one system and another in quality and workmanship as well as machinery and material. Every municipality always expects to get the best system and the best material. Sometimes they get it and sometimes they don't. A good plant in most cases will cost more than a poor plant, but the operating expenses of a first class plant and the unreliability of service and depreciation in all cases will be considerably less than that of a poor plant. It would seem that these questions would be best answered by a competent engineer, one who has given years of study to these matters and has gained practical experience by having had charge of many installations and of various systems, acquainted with the many kinds of apparatus and machinery and who has made these matters his business for years. Answering the above questions is, however, only a very small portion of the work the engineer should be entrusted with. After it is decided to build a plant, the engineer will draw the plans and specifications for the proper kind of plant with a view primarily of getting a good system and good work instead of cheap. He will stand between the purchaser and the contractor, protect him against overcharges and charges for extra work, he will see to it that he gets the right kind of material, plenty of competition and will prevent combination between the bidders, and last, but not least, save a lot of time and worry.

When the contract is let, it should not, in all cases, be let to the lowest bidder.

Aside from the question of machinery the bidder's financial standing and above all his ability and knowledge of the work he is building or, in other words, his experience should be taken into serious account. This is only too often neglected and is the most important point about installing a plant. The contractor should understand how to do the work correctly, must understand the working of the various apparatus he is to install and how to erect and put them together correctly, if a first class plant is to be insured.

Referring again to the above questions they may, however, be answered in a general way, to wit:

Assuming we have in view the construction and installation of a combined water-works and electric light plant for a town of 1,800 people, the following general ideas will be approximately correct: The plant should be such a one as to insure high efficiency and low depreciation, thus reducing the operating expenses which is equivalent to low rates to consumers. The plant should be compact, close to the water supply, railway tracks, and as near as possible to the business center. To insure high efficiency and low de-

* Consulting Engineer, St. Paul, Minn.

preciation the machinery should be of the best grade and of such design as to consume as little fuel as possible per horse power hour of work done. The buildings should be of brick or stone of neat and substantial design, one story high with twelve-inch walls, ceiling not less than ten feet high and of such size as to allow the duplication or enlargement of plant. The building should consist of coal room, boiler room and engine and dynamo room, all under one roof and conveniently arranged to save labor during the operation. For a town of 1,800 people the following machinery and apparatus should be sufficient and ample for a term of years, to wit: Building size, about 36 feet by 60 feet; boiler of 125 horse power capacity; engine of 125 horse power capacity of either the slow or high speed type, compound and non-condensing; and dynamo to be directly connected to shaft of engine and of 75 kilowatt capacity equal to about 1,500 lights actually burning. The auxiliary apparatus and machinery should consist of a heater, condenser, boiler feed pump, injector and steam piping and switchboard equipment. All the auxiliary apparatus should be of sufficient size to take care of a duplicate plant. The water-works end of the plant should consist of a small power pump of about 100 gallons capacity per minute driven directly by and belted to the engine or driven by a motor directly geared to the pump.

This pump is to take care of the domestic supply only and to do the daily pumping to keep the water tank or reservoir full. For fire protection there should be added an ordinary duplex steam pump of at least 750 to 1,000 gallons capacity per minute, this pump to be used only in case of fire. In addition there should be installed a steel tower with steel or wooden tank of about 75,000 gallons capacity or a reservoir depending on whether the immediate vicinity is level or hilly. If the town location is approximately level, the steel tower and tank would have to be at least 100 feet high to the top of tank above the highest point in town in order to provide the proper pressure. The distribution pipe line should preferably consist of eight and six inch pipe, four inch pipe, if possible, to be avoided. Dead ends should also be avoided and the pipe line laid in such manner as to form a complete circuit. A plant as above outlined would cost about $28,000, based on about two miles of pipe line, on taking the water from a lake or large springs, and at present prices of labor and material.

Will it pay?

As to how such a plant would pay there cannot, of course, be any doubt that it will be a well paying investment unless grossly mismanaged, but how well it will pay will depend mainly:

1. On the amount of light, power and water used by the inhabitants.

2. On the established rates for furnishing light and water.

3. On the management of the plant. As to rates for lighting they should, as a general rule, not be less than ten cents per 1,000 watt hours, which is approximately equal to one-half cent per each sixteen candle power lamp per hour while burning. As to rates for water for domestic purposes this cannot be stated even generally as the cost of pumping depends in each case how high the water must be raised to the tank or reservoir. This will vary from almost nothing to twenty cents per 1,000 gallons.

An important point in connection with a water-works and electric light plant, provided it is a municipal plant, and one that is seldom properly considered, is the accumulation of a sinking fund to take care of the depreciation of plant and the outstanding indebtedness on the plant. The proper way to raise this fund would be to charge the village a certain amount for each street lamp and for each hydrant per year. The amount thus determined should either be put aside out of the earnings of the plant, or if the earnings are not enough on account of the rates charged, the rates should either be raised or the amount raised by taxation.

The only rational way of charging for light and water is by means of meters, thus preventing waste for individuals as well as for the owner of the plant, and providing a means of checking the waste.

The two main items of expense in operating water-works and electric light plants are labor and fuel. It is perhaps needless to say that the labor required to operate a combined water-works and electric light plant is the same as required to operate an electric light plant only, but the labor required to operate a water-works plant only is much less than that of an electric light plant. As for fuel, it takes only very little more to operate a combined plant over a lighting plant and to take very much less fuel to operate a water works plant than it does for a lighting plant.

It will be remembered that these statements refer to plants in small towns only up to say about 1,800 people. Of course there are exceptions to be noted.

If a water-works only or a lighting plant only is to be constructed the above outlined equipment of a combined plant will be substantially retained except that the steam plant be substituted for a small gasoline and the steam pump be eliminated entirely.

A lighting plant of 1,500 light capacity (16 candle power lamps), which would mean about 2,500 lights wired in with meters used, would cost, complete, approximately $16,000 for a town of 1,800 people.

A water-works plant for the same town, with two miles of pipe line and a lake or spring supply, would cost about the same amount.

POLITICS AND MUNICIPALITIES

Danger of Strengthening Political Machines—The Political Side of the Public Service Corporation

By George Stuart Brown *

GEORGE STEWART BROWN

THE theory of municipal ownership of public utilities in this country is attacked with most vigor and most successfully by the argument concerning the strengthening of the political machines by the addition of the large number of new governmental employees, which public ownership necessarily entails. An the public being familiar enough with the abuses of the spoils system through the control of votes by the clever use of patronage has naturally been afraid of anything which on the surface (and I believe it is largely on the surface) seems to promise increased strength to the city boss—and his machine through the creation of these new offices.

The advocates of municipal operations are prone to scoff at this argument without giving the real basis of their faith in the matter.

1st. Because they consider this addition to the machine strength as unnecessary if a rigid civil service system is established at the same time, which they argue must come as a concomitant growth as it did in England.

2nd. Because they believe that the many advantages to be derived from public ownership, and particularly the great saving to the people of the future increment in franchise values now safely locked in private hands would more than compensate for this danger. I believe, however, that the main incentive to a belief and hope in municipal ownership is the growing disgust at the corporate control of our legislative bodies, our nominating conventions, and sometimes through the expenditure of immense campaign contributions of the electorate itself, or enough of it to change the result of primary or election.

As a practical politician and a member of the local legislature of one of our great cities who is interested in the question of municipal ownership because it is one of the subjects in the popular mind, the writer wishes to study and discuss it from every point of view with the object principally of getting more light upon it for himself. But he must confess that the fact that makes it, and will more and more make it, a burning issue in our local politics is the degrading interference of the public service corporations in our State and city politics, amounting often to such a complete control of all administrations and both parties that in dealing with the problems they present a strange paralysis seems to take hold of the city's official life.

This point of view as to the relation of the local public service corporations as they now exist under private ownership to the party management of our great parties, to the machine as the independent calls it, to the organization as the boss and his satellites fondly name it, and through the party organization to the local government, legislative and administrative, has an important bearing upon the question in the most practical way.

The organization, that mighty name indicative of controlled, ordered, systematized power is now in every instance in our cities, drilled and commanded by a single man, in each party, with military or feudal authority united by spoils but cemented and made permanent by campaign funds. The very name itself charms the multitude by its promise of strength and compactness and condemns the free lance who objects to its slavish system or asserts his independence, as a dreamer or a theorist unless, indeed, the people are so stirred by the principles he advocates as to follow him in such numbers that he is able to successfully combat it. For success we worship after all with or without "the organization."

You cannot prove it except very occasionally when the thieves and corruptionists happen to fall out with each other, but every one in active politics believes that the basis of the modern campaign fund is the contribution of the public service corporations and those heavily interested in their securities. That they thus contribute sometimes to one party, sometimes to the other but more frequently to both parties, can hardly be doubted.

The great bosses often use them as foundation stones in the construction of their machines. Sometimes by blackmail and threat of adverse legislation, sometimes by protecting them from failure to perform their obligations, again by granting them franchises on terms unfair to the public and to future generations, contributions sufficient to control primaries and carry elections are wrung from their coffers to the paralysis of intelligent, fair and just government.

The finances of a large city can be more easily affected for the bad by the reckless granting of franchises without proper safe-guards for long terms (and fifty, or even twenty-five years, is a long term) on the one hand and the careless undervaluation of the enormously valuable property rights in the streets now in private hands, on the other, than by any other form of misgovernment.

It is proverbial that in almost every large city and many small ones also, the assessed value of the property of these public servants is far below the market value of their bonds and stocks. Occasionally laws have been passed to com-

* A. B., Johns Hopkins University, 1893; LL. D., University School of Law, 1895; Practicing Lawyer, Baltimore; Member First Branch City Council, 1889; reëlected 1901; Member Second Branch City Council since 1903.

pel their proper valuation for purposes of taxation, but so great is the fear of their influence in the primary and election among officials that they are not always enforced. Illinois had such a law passed on March 30, 1872, which allowed the average market value of the outstanding bonds and stocks as the true measure of the value for assessment purposes of the corporation's property. And the Supreme Court of the United States in the year 1875 (See State Railroad Tax Cases, 92, United States Reports, p. 575) declared in the following emphatic language that this was a fair and just rule. Mr. Justice Miller, speaking for the court said:

"It is obvious, that, when you have ascertained the current cash value of the whole funded debt and the current cash value of the entire number of shares, you have by the action of those who above all others can best estimate it, ascertained the true value of the road, all its property, its capital stock and its franchises; for they are all represented by the value of its bonded debt and of the shares of its capital stock."

This statute thus vigorously sustained was unfortunately not enforced until the year 1901 or thereabouts when the Board of Taxation was compelled to carry out its provisions by mandamus proceedings brought by the school teachers of Chicago. (See State Board of Equalization vs. People, 191 Ill. Reps., p. 528.)

Mr. John Ford's New York Law, which he has described in such an interesting way, attempts to reach this class of property in direct fashion. Though signed by Theodore Roosevelt, in 1899, it is still being litigated in the Courts. On April 28, 1903, it was sustained by Judge Alton B. Parker and his associates in the New York Court of Appeals (174 N. Y., 417) four years after its passage, and is now on appeal to the Supreme Court of the United States. Screened behind this defensive litigation, some of the largest traction and lighting interests in New York City have not yet paid one cent of taxes under its provisions.

If sustained now by the Supreme Court, before whom it will be argued this fall, it is probable that it will be vigorously and fearlessly enforced, as an attempt by the powerful Odell administration to secure its repeal was frustrated by an aroused public sentiment. This indicates that the press and public of New York realize and understand the importance and justice of the law. Much good will then result from its enforcement, not only in New York but by example throughout the United States. The destructive delay and neglect shown by the taxation officials in the Illinois case, let us hope will not be repeated.

In Maryland, although way back in the year 1879, the Court of Appeals said unmistakably that an easement enjoyed in the bed of a public street may be assessed and taxed as real estate (see 50 Md. Rep., p. 274), it is only now in the year 1904 that our present Appeal Tax Court, the local assessing body for Baltimore city, backed by an opinion of City Solicitor, Wm. Cabell Bruce, is at last including the value of the local franchise in the assessments of the public service corporations. Incidentally the increased assessments from this source will come at a very opportune time when the city's taxable basis has been much reduced by the recent fire.

An interesting instance for a 9 per cent. gross receipt payment received by the city of Baltimore, and how it came about, is worth quoting here.

In the year of grace 1859, a party of capitalists offered to construct a street railway in Baltimore, and besides other favorable terms to the city, as for instance: a right to repurchase every fifteen years, they proposed a four cent fare. Think of it, a four cent fare offered way back in 1859! Their ordinance was passed by the council, but the mayor, Mr. Thomas Swann, seeing an opportunity to procure a public improvement fund, vetoed the ordinance with the suggestion that the rate of fare be raised to five cents and the extra cent go to the city, the railroad retaining four cents as they had offered. His suggestion was complied with and the twenty per cent. gross receipt payment created, the railroad company being in effect the collector of the one cent from the people for the city treasury.

Years afterwards two successful attempts were made with the aid of weak and venal legislators to allow the railroad to reduce the proportion the city received, first to 12 per cent. and later to 9 per cent., the company retaining the balance. Now as reduced to 9 per cent. of the gross receipts and by comparison with companies in other cities which pay next to nothing, it is often called a heavy burden. However, it was estimated some years ago by Judge Oscar Leser, of the Appeal Tax Court, that including this payment, street paving assessments and all other taxes, the company paid less than $500,000 a year, while he also estimated the then market value of its bonds and stocks to be about $50,000,000. This would equal a tax rate of one per cent. of the value, while the ordinary real estate holder is extremely fortunate if he escapes with an annual city and State tax of two per cent. of the value of his holdings.

Thus, this instance commonly considered most favorable, as compared with many other cities, still points to the same general conclusion and illustrates the difficulty of taxing the property of public service corporations at the same rate as other property is taxed. It further illustrates the deceptive character of a gross receipt tax, as compared with the direct system adopted by Mr. Ford's New York Law.

These examples, like New York and Illinois, are encouraging in themselves as instances that a real fight has sometimes been made for equal taxation of these industries, still their exceptional character is discouraging and the further fact that their results have in every instance been delayed by long and tedious litigation, is likewise discouraging. So that perhaps they only illustrate after all the difficulties in the way, political and legal, in having the principle of equality fairly applied.

Thus the advocate of municipal ownership can often truthfully say "one cannot get equal taxation from them, the exceptions simply prove the rule," and adds, "this is but another instance of the subversive political power they wield through their evil alliance with machine politics which it is the mission of public ownership to destroy. And, indeed, is it not so, that no matter how good the law or how clearly its provisions may be sustained by the courts, if the political control is strong enough, the party controlling can prevent in the long run, its honest enforcement. So that with the attention of the public service corporation

turned to the capture of the taxation officials, and if their power over bosses and party machines remains as strong as it now exists, is there not grave danger of their success?

So much for taxation. The attempts at regulation of the charges, rates and service of these industries, has generally failed in accomplishing beneficial results and this also largely because of the same kind of political control exercised by them. How can we expect regulation of service and rates, in its very nature a difficult and delicate matter, from legislators who are nominated and elected by the use of campaign funds contributed largely by those who are to be regulated? Does not that simple proposition explain the almost universal failure of attempts at regulation? This political control, therefore, exercised over both party organizations, while often not preventing blackmail in the shape of bogus competition—in the first place does prevent—

1st. Equal taxation.

2nd. It prevents fair and honest regulation of service and charges.

3rd. By its methods, it degrades and helps to keep on a low level, the spirit of practical politics in our cities.

What will cure it? Municipal ownership, coupled with rigid civil service regulations, promises to do it. And the people, realizing at last in no doubtful way the nature of the existing political control, destructive as it is, both to decency in political life and ultimately to democracy itself, will take this remedy and that speedily, unless, indeed, the public service managers learn to seek their own best interests as well as that of the public, by giving the best service at reasonable rates consistent with a real, not a watered capitalization, by paying, without protest, their honest share of the public taxes, by refusing to seek political control through the indirect method of boss manipulation, by campaign contributions, by refusing to assist leaders and legisators with passes, appointments and other favors, and by refusing with equal firmness to pay one dollar to prevent blackmail.

What better argument can they have than duty well performed as a basis for a new or additional franchise to extend their service when it is really desired by the public? In spite of their support of many base, weak and easily used men, there are usually in every legislative body enough honest men to prevent a blackmailing scheme against their interests from going through under existing conditions. How much better the possibility of preventing it when their powerful support is removed from the class of corruptionists whom they now help to elevate to power only to be blackmailed by them in turn when the reward is large enough.

What better argument against a bogus rival, gotten up for the purpose of selling out, than public duty well performed, removing at one stroke the entire political capital of the aforesaid rival when he asks for a franchise, namely: discontent with the inadequate service or the exorbitant price rendered or charged by the existing company.

Can you not see it Mr. Corporation Manager? Can you not see that you best interests along with those of every citizen lie in having an economical, just government with independent, incorruptible city officials?

See it while there is yet time, and win popular favor before it is too late by acting the part of decent citizenship. If you do not, the American people, having at last realized the evil, will apply the remedy and public operation, will retire you forever from control of the public service and the business of political manipulation.

FIGHTING MOSQUITOES IN GERMANY*

Professor Fluegge, president of the hygienic institute at Breslau, has sent the following circular to the owners and managers of dwellings in one of the districts of that city:

The common council has resolved to fight in a systematic manner the mosquito plague, which prevails every year, and the plan for the purpose has been worked out at this institute. It is necessary in the first place to destroy, before warm weather sets in, the mosquitoes which pass the winter in the cellars and basements of houses. These cellar and basement mosquitoes will be destroyed by municipal experts without inconvenience to the people and without injury to property. In order to make it possible to carry out the plan successfully, we respectfully request the admittance of the disinfectors to the cellars of houses and permission for them to take the steps necessary to kill the mosquitoes. The disinfectors will have identification cards.

According to the *Silesian Gazette*, the plan for fighting the mosquito plague is to be worked out in two directions. The hibernating mosquitoes, which are almost always found in the cellars of houses adjoining unoccupied territory, parks, gardens, etc., must be killed. These are found in somewhat damp cellars, facing north, and are recognizable with difficulty by those not experts, but cover the ceilings by thousands. In the spring they leave and lay their eggs in water, the larvæ producing mosquitoes within three to four weeks. A supplemental effort will be made to destroy the larvæ, which are found principally in stagnant, shallow pools. These must be either filled in or treated with malachite green or other larvæ-destroying substances.

For the present this process will only be employed in that part of the city which suffers most from the mosquito plague. If it proves successful it will be extended next year over the whole city. Fighting mosquitoes will be carried on in a systematic manner on a scientific basis. Summer resorts and watering places, especially, should imitate the example set by Breslau.

* *From United States Consul-General Guenther, Frankfort, Germany.*

SYRACUSE WANTS MUNICIPAL LIGHTS

A Progressive Mayor of the Empire State Presents the Only Argument a Corporation Can Understand

MAYOR FORBES, of Syracuse, N. Y., has been securing statistics on electric lighting, prior to the reletting of the contract for his own municipality, and has published a table of data from fifty cities, which is of interest.

Seven of the fifty towns reported have municipal plants, and the trend toward public ownership is stated by the Mayor as follows:

"The comments made by the various city officers answering communications addressed to them are instructive, as they show a trend of a municipal thought in regard to the problem of city lighting, and also as showing the gradual cheapening of electricity.

"In 1900, the city of Baltimore paid $127.75 per arc lamp per year, which on a threat to establish a municipal plant was reduced to $99.92. The city has just received a bid for a term of years at a rate of $67.49 per arc lamp per year.

"The city of Memphis, Tenn., has under consideration the granting of a franchise to a new company, which offers arc lights to the city at a price ranging from $65 to $72.50, according to the number used. This company makes a further offer to sell to the city whenever it shall deem it advisable to purchase.

"The city of Knoxville, Tenn., is pushing a bill in the Tennessee legislature, allowing it to establish and maintain a municipal lighting plant.

"The city of New Orleans, with a population of 300,625, has been paying $85 a year per arc lamp, and has already entered into a new contract at $77 a year.

"The city of Omaha has been paying $94.50 a year per arc lamp. In the opinion of the Mayor and the Common Council, this price is excessive, and a proposition for municipal ownership was defeated only because the city had already bonded itself extensively for a new water-works system. The authorities, however, have held up the letting of a new contract, and are insisting that before such contract shall be let that there shall be a very material reduction in the price.

"Bryant T. Berry, the Mayor of Dallas, Texas, writes as follows concerning the experiences of his city:

"'Up to ten years ago we paid $130 per year for each light on moonlight schedule. After that we went on an all-night schedule, and to keep us from building a plant we got a bid of $100 for three years, and since then we have been paying $83.75, and we now have a bid of $73 for a five-year contract. We are now considering the question of making a new lighting contract, or building our own plant, and the situation has no doubt given us the bid of $73. We feel that this is going down toward a correct price, but there are advantages in owning a plant outside of making lights, to wit: Cheaper motive powers in daytime for municipal concerns, and this proposition is being urged in favor of municipal ownership.'

"Although the city of Cleveland, with a population of 414,950, paid but $75 an arc lamp per year, there is to be a still further reduction in 1905, a bid of $73.56 having been submitted.

"In Buffalo, which pays $75 a year per lamp, a new company capitalized at $1,000,000 has made application for a franchise, so that a still further reduction may be expected, owing to competition.

"The city of New York has decided to take up the question of municipal ownership, and plans have been made to establish a municipal lighting plant.

"The city of Seattle, which is paying but $66 a year per lamp, is now at work installing a municipal plant at a cost of $500,000."

The figures as given in the appended table show that seven of the fifty cities have municipal plants, and that the average cost of each arc lamp is $66.18 per year, while the average cost of each arc lamp in the 43 cities purchasing light of private companies is $88.44, or is greater by 33 1-3 per cent.

That the cost of coal has much to do with the expense of producing light is admitted, but its real influence is hardly apparent in the charges made by the companies. Reference to the table shows that the average price of coal per ton during the year was $3.00 at Fall River, Mass., Lowell, Mass., Hartford, Conn., and Washington, D. C., and the prices charged for each arc lamp are respectively $90, $65, $80, and $85. Coal cost $2.50 per ton at Atlanta, Ga., and at Utica, N. Y., and the cost per lamp was $99.92 in the former and $116.18 in the latter place. Of 20 cities purchasing light of private companies at a lower rate than that paid by Syracuse, Mayor Forbes shows that the average price of coal is less in nine and greater in eleven than the cost in Syracuse.

His summary of the situation is:

"Summarized, therefore, it may be deduced from the accompanying table that while Syracuse is paying less for its lights than very many cities, it is paying more than its location in respect to coal fields, and its population warrants it paying more than those cities where progressive municipal government and careful care of municipal economy prevails.

"In considering the question of municipal ownership of lighting plants, the city of Detroit would seem best worthy of study, because from its installation the lighting plant there has been in charge of an intelligent commission which has seen to the keeping of proper records and which has apparently not been afraid to charge to the cost of operation every item which should be so charged. This city operates a plant which furnished 2 597 arc lights, 14,871 incandescent lights, and 35 motors, with a total horse-power of 121 at a total cash cost for the fiscal year ending June 30, 1904, of $123,093.99, or a total cost, adding items of depreciation on discarded machinery, on investment, interest and lost taxes, of $188,-

936.22. This plant is modern and up to date in every respect. There are 47,184 feet of underground conduit, upon which are operated 383 arc lamps. The initial cost of the plant was $729,222.73, and the present value is estimated at $824,-021.24. There is probably no doubt that should the city ever care to sell the plant it can secure this sum for it.

"The cost per arc lamp to the city is made up of the following items: Operating disbursements, $40.16; depreciation on discarded machinery, 47 cents; depreciation at 3 per cent. on investment, $8.23; interest of 4 per cent. on investment, $10.27; lost taxes on investment, $2.43.

"Since the original bond issue for the maintenance of the plant, there have been no further bond issues, extensions being taken care of by annual appropriations and the tax levy. The system seems to be entirely satisfactory to the people of Detroit."

City.	Population.	Municipal or Private Plant.	Cost Per Arc Light Per Year.	Fuel Used.	Average Price Coal.	Capitalization of Plant.
Albany	93,920	Private	$117.80	Coal		$2,000,000
Allegheny	138,018	Municipal	68.59	Coal	$1.88	
Atlanta	96,550	Private	75.00	Coal	2.50	
Baltimore	531,313	Private	99.92	Coal	3.20	2,700,000
Boston	594,618	Private	124.10	Coal		10,500,000
Bridgeport	77,635	Private	83.00	Coal		
Chicago	1,873,880	Municipal	75.00	Water		
Cincinnati	332,934	Private	96.00	Coal	3.75	700.000
Cleveland	414,950	Private	54.36	Coal	2.75	1,650,000
Columbus	135,487	Municipal	66.00	Coal	1.75	31,000,000
Dallas	44,159	Private	73.56	Coal	1.30	2,500,000
Denver	144,588	Private	54.36	Coal	2.75	1,650,000
Detroit	309,653	Municipal	35.00	Coal	1.40	485,000
Elmira	37,106	Private	73.00	Coal	2.00	
Fall River	114,004	Private	90.00	Coal	3.00	3,250,000
Grand Rapids	91,630	Municipal	61.65	Coal	2.58	849,506
Hartford	87,863	Private	80.00	Coal	3.00	
Indianapolis	196,033	Private	109.50	Coal	4.15	350,000
Jersey City	219,462	Private	70.95	Coal	2.85	45,000
Kansas City	173,064	Private	70.00	Coal and water	4.00	1,900,000
Louisville	215,402	Private	74.00	Water		
Lowell	100,150	Private	97.50	Water		
Lynn	72,350	Private	65.00	Coal	3.00	
Memphis	113,669	Private	84.00	Coal		
Minneapolis	214,112	Private	120.45	Coal		
Nashville	82,711	Municipal	98.55			
New Bedford	68,955	Private	85.00			
New Haven	114,600	Private	94.00	Coal	5.00	
New Orleans	300,625	Private	45.00	Coal	1.79½	200.000
New York	3,766,139	Private	98.55	Coal		845,000
Omaha	113,361	Private	82.12½	Coal	3.75	1,000,000
Paterson	113,267	Private	77.00	Coal	3.25	
Portland, Ore.	98,655	Private	146.00	Coal		85,338,000
Providence	189,742	Private	94.50	Coal		
Reading	85,051	Private	101.00	Water		
Richmond	86,148	Private	63.60	Coal	3.80	5,000,000
Schenectady	43,538	Private	109.50	Coal	1.75	
Scranton	107,026	Private	85.00	Coal	2.91	
Seattle	92,020	Private	34.00	Water		80,000
St. Joseph	110,479	Municipal	72.12	Coal	1.25	300,000
St. Paul	172,038	Private	66.00	Water		
St. Louis	612,279	Private	95.00	Coal	1.60	102,000
Toledo	145,901	Private	98.00	Coal	2.00	10,000,000
Trenton	76,766	Private	83.00	Coal	2.05	
Troy	75,567	Private	118.62	Water and coal		2,000,000
Utica	60,097	Private	116.18	Coal	2.50	2,000,000
Washington	293,217	Private	85.00	Coal	3.00	
Wilmington	81,300	Private		Coal	5.00	
Worcester	128,552	Private	108.00	Coal	4.75	600,000
Yonkers	52,701	Private	109.50	Coal		200,000

PORTLAND CEMENT*

Its Uses in Engineering Constructions—Elasticity of Mortar and Concrete—Continued

By E. Kuichling, C. E.†

It has been found by experiment that when a mass of indurated cement, mortar or concrete is subjected to the action of an external force, a slight change of dimension ensues without disintegration, and that on the removal of the force, the mass immediately returns to its initial dimensions. Within certain limits of stress, these materials accordingly possess elastic properties, and it becomes of interest to ascertain the magnitude of the elongation or compression which they can endure without permanent alteration of size or injury to their physical structure. The same remarks are also applicable to the natural stones and bricks commonly used in construction, and as these substances usually constitute the greater part of a mass of masonry, it will be proper to commence our investigation with a brief account of their behavior under stress.

The relation between the external force which tends to elongate or compress a body and the resulting change of length, is usually expressed in terms of the modulus (E) of elasticity of the substance as determined by experiment. Thus, if the change of length per unit of length is denoted by (e), and the applied force per unit of area of the cross-section of the body by (f), then (E) is the quotient of (f) divided by (e). It is also found that the value of the modulus (E) is not constant for all values of the force (f) from zero to the magnitude which produces rupture of the material; but in general the variation in the value of (E) from a constant magnitude is very small up to a certain value of (f) which is called the elastic limit of the material, and beyond which permanent changes of length are produced until finally rupture ensues. In many natural stones and mortars, however, a comparatively small force (f) causes a slight permanent change of length or set, which increases very slowly as the force increases, and in these cases the modulus of elasticity (E) is usually computed by dividing the difference between the initial and terminal values of (f) by the difference between the total and permanent values of (e) corresponding to the terminal force (f).

It may also be remarked that owing to the difficulty of measuring accurately the very small elongations of test specimens of stone, mortar and cement which occur before

* Copyright, 1905, by The Municipal Journal Publishing Company.

† Engineering Editor, MUNICIPAL JOURNAL AND ENGINEER.

rupture, the modulus of elasticity of these materials is commonly determined by experiments with the specimens subjected to compressive forces, as their resistance to crushing is generally more than ten times greater than their resistance to tension.

WATERTOWN ARSENAL TESTS OF ELASTICITY OF NATURAL STONES, BRICKS, ETC.

While many experiments have been made in Europe to determine the elasticity and compressive strength of different kinds of natural stones, bricks, mortar and concrete, the results are of less interest to American engineers than those which have been obtained in recent years with American materials at the Watertown Arsenal; and for this reason few data relating to the elastic properties of foreign stones and bricks are given in the following table.

The experiments at the Watertown Arsenal were made mostly in 1890, and 1894-1896, and are described in the reports of the establishment for those years. The test specimens of stone were obtained from various States, and were generally prisms about 24 inches long, 6 inches wide and 4 inches thick. On being subjected repeatedly to compression lengthwise, with gradually increasing and diminishing forces, the dry stones soon exhibited a small permanent set from which they did not recover during the period of time embraced by the observations. The number of tests for each coefficient or modulus of elasticity varied from one to nine, but usually two or three were considered sufficient. The resulting values of (E) for the same kind of stone differed widely, and in some cases two samples taken from the same quarry gave greatly differing values. To facilitate the comparison of the stones, determinations of their specific gravities were also made, and it was found therefrom that marked differences in the weight per cubic foot existed in samples of the same kind.

The values of (E) were first determined at pressures ranging from 1,000 to 3,000 lbs. per square inch, and then at much higher pressures. In general, the results derived from the higher pressures are considerably greater than those from the lower ones, but as stresses of more than 3,000 lbs. per square inch rarely occur in practice in masonry structures, only the first set of determinations are given in the following table. It may also be remarked that inasmuch as the actual stresses in masonry are usually much less than 1,000 lbs. per square inch, the corresponding values of (E) will probably be not more than two-thirds or three-fourths of the values given in the table. In the case of bricks, the samples were likewise tested by compression lengthwise, with widely differing results, as is to be expected considering the lack of homogeneity of the material, the short available length of the specimens and the difficulty of securing perfectly even bearing surfaces. The bricks tested were all well-burned and suitable for use in the faces of buildings.

For convenience of comparing the values of (E) for stones and building bricks with the values of (E) for cement, mortar and concrete, a few data relating to the latter materials have been given in the table; but as the experiments with cement and concrete are both much more numerous and more important, they will be considered subsequently.

MODULUS OF ELASTICITY OF BUILDING STONES AND BRICKS IN COMPRESSION, FROM EXPERIMENTS AT WATERTOWN ARSENAL, 1890-1896

MATERIALS.	No. of Determinations.	Modulus of Elasticity (E) in lbs. per sq. in. for pressures to 3,000 lbs. per sq. in.			Average weight lbs. per cub. ft.
		Average.	Maximum.	Minimum	
7 Varieties of Granite, from several States	10	6,543,000	9,800,000	4,545,000	161.6
10 Varieties of Marble, from several States	11	8,388,000	13,333,000	3,640,000	168.0
5 Varieties of Limestone, from several States	6	7,522,000	14,720,000	3,226,000	....
8 Varieties of Sandstone, from several States	12	2,863,000	7,711,000	1,250,000	137.9
6 Varieties of well-burned face Brick, Class I	6	1,520,000	1,770,000	1,040,000	....
6 Varieties of well-burned face Brick, Class II	6	2,265,000	2,570,000	2,050,000	....
5 Varieties of well-burned face Brick, Class III	5	4,302,000	5,000,000	3,180,000	....
Averages for said three classes of face Brick	17	2,601,000	5,000,000	1,040,000	....
* Common building Brick made at Horseheads, N. Y.	12	1,305,000	1,815,000	540,000	....
† Common brick piers, 13″x13″x 80″, laid with Portland Cement mortar	6	881,000	1,040,000	680,000	....
Plaster of Paris, sample 10 mos. old	1	920,000	.....	.....	....
Dyckerhoff Portland Cement, prisms 4″x6″x24″, mixed neat, 10 mos. old	2	2,410,000	.....	.....	....
‡ Alpha Portland Cement, prisms 6″x6″x18″, mixed neat, 7 days old	1	5,655,000	.....	.....	....
‡ Same, mixed with 1 part sand, 36 days old	1	2,506,000	.....	.....	....
‡ Same, mixed with 2 parts sand, 36 days old	1	2,526,000	.....	.....	....
‡ Same, mixed with 2 parts sand and 5 parts cinders, 3 mos. old	1	1,279,000	.....	.....	....
‡ Atlas Portland Cement, mixed with 2 parts sand and 5 parts cinders, 3 mos. old	1	1,138,000	.....	.....	....
§ Same, mixed with 2 parts sand and 4 parts broken stone, 3 mos. old	2	5,107,000	5,792,000	4,421,000	....

TESTS OF ELASTICITY OF PORTLAND CEMENT, MORTAR AND CONCRETE

Among the earliest determinations of the elastic properties of Portland cement, mortar and concrete under compression, may be cited those made by the Committee of the American Society of Civil Engineers on the Strength of Cements, etc., during the years 1886-8. In the report of that committee in *Trans. Am. Soc. C. E.*, vol. 17, p. 213 et seq., 1887, W. W. Maclay, C. E., gave the results of his compression tests of three cylindrical prisms of Portland cement and mortars made therewith as follows, the prisms being 24½ inches long and 4⅛ inches in diameter:—

COMPOSITION OF SPECIMEN.	Age.	Load in lbs. per sq. in.	Compression in inches.
1. Neat Cement	104 days	100 to 1,850	0.0847
2. Mortar, 1 cement to 2 sand	3 mos.	150 to 1,050	0.0450
3. Mortar, 1 cement to 3 sand	2 mos.	100 to 700	0.0653

As the results were somewhat irregular and the permanent set was not closely observed, no point in the series of observations could be fixed for the probable elastic limit of each specimen, and hence other experiments were deemed necessary.

* Tested by S. M. Turrill, C. E. *Proc. Am. Soc. C. E.*, 1903.
† Tested by E. J. McCaustland, C. E. *Trans. Assoc. C. E. Cornell Univ.*, 1900.
‡ For pressures to 600 lbs. per square inch. Watertown Arsenal, 1898.
§ Tested by W. H. Henby, C. E. *Journal Assoc. Eng'ng Soc's*, 1900.

In 1888 the committee reported a few other tests in *Trans. Am. Soc. C. E.*, vol. 18, p. 267. A 12-inch cube of mortar, mixed in the proportion of one part National Portland cement to 3 parts sand, and presumably several months old, was subjected for a short time to a compressive force of 5,556 lbs. per square inch whereby it was compressed 0.053 inch. A second and third short application of the same force increased the compression to 0.0600 and 0.0665 inch respectively, and on continuing the pressure for ten minutes, it increased to 0.0752 inch. On removing the pressure a set of 0.0415 inch remained for a brief period, and gradually reduced to 0.0405 inch in the course of six minutes. A fourth application of the same pressure produced a compression of 0.0810 inch, which increased to 0.0930 inch on continuing the pressure for ten minutes. On removing the pressure, the set was 0.0550 inch at first, and gradually reduced to 0.0532 inch a few minutes later. The fifth and last application of the pressure caused a compression of 0.1020 inch, which increased to 0.1210 inch after two minutes, when the cube broke. The entire series of experiments occupied only 80 minutes. At the third application of the pressure, the elastic compression was 0.0347 inch, whence the value of the modulus of elasticity of the material would be $(E) = 1{,}916{,}000$ lbs. per square inch; and similarly at the fourth application it would be $(E) = 1{,}684{,}000$ lbs. per square inch.

The committee also reported the results of several other tests made by applying successive increments of 100 lbs. per square inch pressure, noting the total compressions for each higher pressure, and then deducing the average elastic compressions per unit of length. The test specimens were: two 12-inch cubes of neat Dyckerhoff Portland cement, 22 months old; two similar 6-inch cubes 14½ months old; and three cylinders of the same cement, 24½ inches long and 4⅛ inches in diameter, kept for 28 days, 3½ months and 6 months respectively. If the modulus of elasticity be computed on the assumption that the given coefficients of compression do not include the permanent set, the results will be as follows:—

Specimen. Dykerhoff Portland Cement.	Age.	Coefficient of Compression per pressure increment of 100 lbs. per sq. in.	Modulus of Elasticity (E) in lbs. per sq. in.
4-inch cylinder	28 days	0.0002472	404,500
" "	3½ mos.	0.0001648	606,800
" "	6 mos.	0.0001094	914,100
6-inch cubes	14½ mos.	0.0000824	1,214,000
12-inch cubes	22 mos.	0.0000500	2,000,000

According to these experiments, the modulus of elasticity of neat Portland cement increases rapidly with the age of the material as is to be expected.

Between 1890 and 1900 the subject received much attention, particularly from foreign engineers, as evidenced by the works of Hartig, Bauschinger, Bach, Durand-Claye, De Joly, Souleyre and others, while in the United States many valuable experiments were made at the Watertown Arsenal. To give a full account of all these investigations would occupy too much space, and hence reference will be made only to the general results attained. In all cases great diversities in the elastic limit and modulus of elasticity of cements, mortars and concretes were observed, so that it has been impracticable to formulate very precise laws in these respects. It appears that the elastic properties of the materials named depend on numerous conditions, such as the quality of the cement, the quantity and character of the inert matter mixed therewith, the quantity of water used in mixing, the thoroughness of the mixture, the intensity of the ramming, the conditions under which the hardening takes place, the age of the specimen and its degree of moisture at the time of testing, and various other influences.

Indurated cement, mortar and concrete exhibit complete elasticity within certain limits of stress, but beyond these limits they acquire a permanent deformation or set, like plastic bodies, after the stress is removed. Repeated applications of the same high stress usually cause a slight increment in the set, and as the stress increases in intensity the set becomes greater, until finally rupture ensues. This characteristic is well shown by the test of the 12-inch cube of mortar described above. Three distinct stages of deformation by external forces are thus recognized. In the first stage with forces of moderate intensity, the deformation is practically proportional to the stress and no appreciable set ensues; in the second stage with higher stresses, there is both an elastic deformation and a permanent set, the latter increasing gradually with the intensity of the stress; and in the third stage with still higher stresses, the magnitude of the elastic deformation reduces while that of the set increases rapidly.

The elastic limit of the material is usually taken as the stress at or near the end of the first stage, whereby no appreciable set is developed. Up to this limit the value of the modulus of elasticity (E) is constant; but when the stress exceeds the limit and produces deformations of the second stage, the value of (E) diminishes more or less rapidly until the third stage is reached, when it again becomes nearly constant, although much less than in the first stage. Furthermore, the deformations produced by the stress are of two distinct kinds, viz.: resilient deformations which disappear on the removal of the stress, and permanent deformation. In the first stage the deformations are wholly resilient or elastic, while in the second and third stages both kinds occur, but vary much in relative magnitude.

Tests made in 1891-2 by a committee of the Austrian Engineers' and Architects' Society with prisms of mortar made of 1 part Portland cement to 3 parts sand, 3½ inches square, 10 inches long and from 90 to 112 days old, gave values for (E) in compression ranging from 6,550,000 to 3,070,000, with an average of 4,650,000 lbs. per square inch, and in tension values ranging from 7,280,000 to 3,410,000, with an average of 5,000,000 lbs. per square inch; about 15 prisms being used in each case. These experiments indicate that the value of (E) for such mortar is practically the same in both compression and tension.

Bach's extensive experiments made in 1894-6 with cylindrical prisms 10 inches in diameter and 39 inches long, composed of various mixtures of Portland cement, sand, broken limestone and gravel, from 76 to 97 days old, and subjected to compression stresses ranging from 0 to 116 lbs. per square inch, gave values for (E) which did not differ much for mixtures of 1 part cement to 2.5 and 3 parts sand and 5 and 6 parts broken stone or gravel made

with two standard brands of cement. Within the limit of stress indicated, the elastic or resilient deformations, also the total deformations, moduli of elasticity and ultimate compressive strengths were as follows:—

CEMENT A.

ITEMS.	Average.	Maximum.	Minimum.
Elastic deformation per unit of length and 1 kilogr. per sq. cm.	1/325000	1/349000	1/302000
Total deformation per unit of length and 1 kilogr. per sq. cm.	1/288000	1/305000	1/265000
Modulus of Elasticity in lbs. per sq. inch based on elastic deformations.	4,620,000	4,970,000	4,300,000
Modulus of Elasticity in lbs. per sq. inch based on total deformations.	4,100,000	4,340,000	3,770,000
Crushing strength in lbs. per sq. inch.	1710.	1990.	1370.

CEMENT B.

ITEMS.	Average.	Maximum.	Minimum.
Elastic deformation per unit of length and 1 kilogr. per sq. cm.	1/273000	1/349000	1/236000
Total deformation per unit of length and 1 kilogr. per sq. cm.	1/237000	1/306000	1/205000
Modulus of Elasticity in lbs. per sq. inch based on elastic deformations.	3,880,000	4,970,000	3,360,000
Modulus of Elasticity in lbs. per sq. inch based on total deformations.	3,370,000	4,350,000	2,920,000
Crushing strength in lbs. per sq. inch.	1160.	1573.	882.

For compressive stresses from 116 to 580 lbs. per square inch, the deformations increased considerably and the values of (E) became correspondingly lower. Between the stress limits of 464 and 580 lbs. per square inch, the average deformations and moduli of elasticity for cements A and B were respectively: elastic deformation per unit of length and stress of 1 kilogram per square centimeter, 1-207000 and 1-161000; total deformation per unit of length and stress of 1 kilogram per square centimeter, 1-183000 and 1-130000; modulus of elasticity based on elastic deformation, 2,950,000 and 2,300,000 lbs. per square inch; modulus of elasticity based on total deformation, 2,600,000 and 1,850,000 lbs. per square inch.

In 1896 Bach made another series of experiments with cement A, wherein it was found that prisms of neat cement exhibited a greater elastic deformation in compression than mortars of 1 part cement to 1½ and 3 parts sand, while in the case of mortars made with 4½ parts sand the elastic deformation was greater than that of prisms of neat cement. He also drew the following general conclusions from his experiments:— (1.) The total compressibility of mortars and concrete is small, and the permanent set is generally about 20 per cent. greater than the elastic or resilient deformation. (2.) Both kinds of deformation increase with the stress, becoming from 60 to 80 per cent. greater with a stress of 580 lbs. than with one of 116 lbs. per square inch. (3.) The compressibility of mortar and concrete is not much different from that of the cement. (4.) There appears to be a definite relation between the compressibility and the crushing strength, but many more experiments are required in order to substantiate this assertion as well as the others.

In consequence of the urgent demand for space in our columns for the consideration of a variety of other subjects, the publication of the remaining articles on Portland Cement will be suspended for a few issues.—E. K.

WATER-WORKS LOSSES*

Modern Method of Detecting Water Waste—A Check on Wilful and Careless Wastefulness

THE secret of success under modern methods is found in that minute analysis to which all departments of a business are subjected in order to find and stop every source of waste, however small. Still, there are losses in every business.

But is there any kind of business in this country that permits the constant *waste* which is so universally allowed in that of selling water? It would almost seem that city officials and private owners of water-works plants *take pride* in knowing that their losses are greater, and are increasing faster, than their neighbors' losses! A stockholder, who would not rest a moment if his street railway company was losing one-half of its nickel fares, will complacently allow his water-works company to lose two-thirds of its product. A Mayor or Alderman will use strict economy with the Police or Fire Departments, but let tens of thousands of dollars go to waste from the pumping station without a question.

Now, what are the facts about water consumption?

There are three quite distinct uses made of public water. These are uses by the municipality for parks, streets and fire protection; uses by railroads, stock yards and manufacturing plants; and uses in dwellings or stores, ordinarily called the domestic supply. For purposes of analysis or comparison, in the first place the water used by manufacturers, railroads, parks, etc., must be considered. All of the water used in this way is, or certainly should be, measured by meters. The quantity so used in one city is no criterion as to what another city will use. Whatever this quantity is it must be deducted from the entire quantity which is supplied day by day. What have we left? We have the quantity which is used by the smaller consumers in the stores and dwellings of the people, *and leakage.* How much do such premises *actually use?* There is plenty of information to be had on this point. Here is one authentic statement:

"The water used by 2,553 families in Providence, R. I., was measured for one year. Five persons counted to a family, make a total of 12,765 people. By actual measurement:

* Prepared by the Pitometer Company, 220 Broadway, New York City.

167 families used but 6.15 gallons to a person
237 families used but 8.20 gallons to a person
361 families used but 10.25 gallons to a person
445 families used but 12.30 gallons to a person
446 families used but 14.35 gallons to a person
462 families used but 16.40 gallons to a person
435 families used but 18.27 gallons to a person

And yet we find American cities publishing the information, year after year, that their works are actually supplying 150 to 300 gallons each day to each person in the city!

The city of Chicago is pumping 200 gallons for each person—man, woman and child. Let us examine the Chicago figures as an illustration:

Taking the 1903 report, we find the total water pumped to have been 137,515 million gallons, of which about 28,000 millions were measured through 7,298 meters. Subtracting and dividing by the population, we have a per capita consumption of 160 gallons per day. When the character of the population is considered, made up as it is very largely of foreigners of limited means, it is apparent that the average consumption of water must be very small. If we estimate it at 60 gallons, or more than three times that of the highest average in the foregoing table, we have left a per capita of 100 gallons or a total loss of 187 million gallons per day.

The water-works plant which furnishes the water cost over $37,000,000, and the yearly expense of pumping was $750,000.

By a very conservative estimate at least $200,000 could have been saved if this water had not been pumped, or 4% interest on five million dollars. Is not this a gold mine, with pay ore in sight, which Chicago could afford to work?

This is a fair sample of the condition of the water-works business in American cities, although there are a few cities that have kept their per capita at one-third these figures by inspections and use of meters. The history of these plants reveals the secret of their success. In all cities care is exercised *above ground*. The salaries of the superintendent, engineer and firemen are not too great. The price paid for coal is carefully looked after. The type of pumping engine is selected with an eye to economy. But here the careful scrunity of the business is allowed to relapse and, as a rule in American cities, the water is poured into a vast network of underground pipes, some of them known to be old and imperfect, without any attempt to ascertain what becomes of it! It is understood, of course, in a general way, that under pressure the loss through a small opening is "very large," but the pipes are concealed from view, pavements are over them, and "it is like finding a needle in a haymow" to find a leak; the loss is half recognized, wholly ignored, and so dividends stop, new machinery is put in and the rate of consumption per capita grows year by year. It is hard to exaggerate on this subject—for instance, Chicago, with 200 gallons per capita, is one of the more extravagant cities in America in this respect, but if the city of Buffalo reduced its per capita to that of Chicago, it would save, *in the cost of coal alone*, $50,000 per year, or the interest on one million dollars!

That this state of things is unnecessary can be seen in the fact that cities and private companies in England allow no such waste. By constant care, and by inspections judiciously made, as a regular part of adminstration, they keep the per capita consumption down to very different figures. For instance: In *Liverpool,* for all purposes, 38.346 gallons per capita, of which only 22.18 per capita is set down for domestic uses of all sorts. There is no restriction of use by the consumers, day or night. In *Manchester,* 35.67 gallons per capita, of which 19.67 gallons is used for domestic purposes, 16 gallons for trade. In *Birmingham,* 29.52 gallons per capita. In *London,* 42.43 gallons per capita. These figures can be duplicated to any extent, but, it will be said, "This is in England!" Let us take the city of Providence, R. I., again: In 1892 the per capita had increased to the alarming extent of 65¼ gallons per capita. In 1894 this *had been reduced* to 51 1/3 gallons by taking pains to discover where this great loss was made! These figures include all the water delivered from the works for *all purposes.* In the town of Ealing, England, with a population of 25,000, the per capita was reduced from 43 gallons per capita to 30.75 gallons per capita, by an eight weeks' campaign of the inspectors!

Losses through defective mains or service pipes tend to increase in amount rapidly. The history of the Chicago works shows this fact very clearly. Thirty-five gallons per capita was the original estimate of the engineer who designed the plant. In 1860 the actual per capita was 43 gallons; in 1870 this had increased to 73 gallons; in 1875 to 100 gallons; in 1890 to 138 gallons; in 1900 it had reached 200 gallons; while in 1903 we find a per capita of 160 gallons after deducting all metered water.

Is it not time for American owners and city officials to call a halt on this waste? It is not all *waste* by any means! A considerable proportion of it is from surreptitious *uses* for private gain. Sometimes, it is charitable to believe, this free use of water is unknown by the recipients, sometimes it is allowed as payment for political or personal debts. Still, such uses should not go on forever. That they will go on unless means are taken to discover them no one can doubt. The Pitometer finds many such cases. In one city where it had been deliberately decided that it would "not pay to make an inspection," the Pitometer revealed on one mile of mains a surreptitious use of water of long duration representing the income from over a million dollars.

By using the Pitometer in a thorough and systematic way in connection with careful inspections of fixtures, any city can know where the water of its system is used and can find every source of loss.

The Pitometer is not a "divining rod," but it affords a very economical and practical way of measuring the water flowing through any pipe in any street. It is the only meter which can be used at will on all sizes of mains. By the new methods which are now being employed the cost of operation has been greatly reduced. Its cost and its ease of handling is such that even the smallest water-works plant can afford to use it. It is peculiarly fitted for use by large cities where every mile of the pipe system can be inspected without interference with the supply of water. Many cities have used the Pitometer with success and many others are preparing to do thorough work with it the present season.

A FEW PRACTICAL HINTS

Suggestions on the Selection of Coal, Water Meters and System of Book-keeping

By S. A. Charles

I HAVE been requested by the Secretary to read a paper to the Convention, and as the request was that it should be practical, I have selected a few topics founded principally on my own experience. I do not claim that that experience is exhaustive, or is necessarily the best, but it may perhaps be suggestive to others; they may possibly be reminded of something they have overlooked, and if there should be any discussion, I may in turn learn something.

I began with the selection and purchase of coal. This is a large item in the expense account of most water-works companies, and there is a vast difference in the values of the different coals. The most expensive coal in cost may prove the cheapest in use, on account of its greater percentage of carbon, the greater evaporating powers. How shall we best determine and in the easiest manner the relative values of samples submitted by competing firms at widely different prices? Our own plan has been to yearly invite bids for a year's supply. We required that a carload or more of the coal should be sent in advance to be tested (with the injunction not to send anything they could not duplicate and furnish regularly). This coal was paid for whether afterwards contracted for or not.

These sample carloads were tested under the boilers, under the usual conditions existing in the plant. A careful record was kept of the number of pounds of coal burned and of the number of gallons of water evaporated by it. This last was obtained by water measurement. From this data we determined the evaporating power of each kind of coal submitted, which averaged in the best samples about eight and three-quarters of a pound of water to each pound of coal burned. This method eliminates all losses varying friction in the machinery, and gives the relative amount of pure carbon in each sample, or at least its relative evaporating power.

After having thus tested the coals a comparison was made taking into account both the cost and the evaporating power of each coal and the award was made on that basis. We sometimes found that the most expensive in cost was the cheapest in use. The next step was to contract with the best bidder. In this contract we stipulated an amount of evaporation equal to that of the sample furnished, and agreed to pay a pro rata increase in price for an evaporation in excess of that of the sample furnished and make a corresponding reduction in payment for any decrease. While at the outset, some years ago, it was somewhat difficult to obtain bids under these conditions, there is now no difficulty on this score.

My next point is the selection of meters. I believe that most any of the standard meters in use (and I have tested a number of them) are sufficiently accurate for all practical purposes and the use of any one of them is a vast improvement over the schedule system. Still among them there may be some points of superiority, and without indicating any preference for any meter whatever I will suggest some of the points we consider. First any meter whatever should be tested as nearly as possible under the same conditions as will exist in actual use. It is very possible that a meter which would give accurate results in filtered water would not do so in muddy water or would get clogged and it should not be expected otherwise. To my own mind meters and filters should be united unless the water requires no filtration.

Again, if accuracy in a meter is necessary anywhere, it is at the usual normal pressure and with usual ordinary faucet or opening. To expect strict accuracy with every varying pressures and every sized opening is expecting too much. Until water is far more expensive than it usually is in this country, it is not necessary that a meter should record precisely one hundred per cent. of the water passing through it with varying pressures, and openings. We prefer that it slightly under-register, so that in case any customer wants his meter tested, we can do so with the assurance that it will be slightly in his favor. The difference may be trifling, but the consumer will be much better satisfied if that difference is in his favor, instead of against him. We change the gearing if it is necessary to accomplish this result, and ourselves test every meter before sending it out.

One important item should not be overlooked, which is the ability to record small leaks and waste. I am inclined to think that these apparently small leaks and losses are more serious than is usually suspected and that their aggregate amount is often much larger than companies are aware of. A stream through a thirty-second of an inch opening would make with us if not recorded by the meter a loss of $1.27 per month and is an element which we consider in the selection of a meter. In this connection it may be well to remark that two or three dollars saved in the cost of a meter is poor economy if it involves a loss of four or five times that amount in annual receipts. A good way of testing for small discharges is by the use of small discs with bores graduated from one thirty-second of an inch to one-quarter of an inch or as I have recently seen, by a new device which I presume will be on exhibition. It can be done by simply turning a small lever or handle to the proper point indicated by a pointer. A comparison of different meters may also be quickly and easily made by coupling them together tandem style and throttling the supply until one of the meters ceases to register. In this experiment it is well to reverse

the position of the meters for the second trial and also to be sure that there is no obstruction in the flow.

As to systems of placing meters and keeping meter accounts I have described our methods at former convention and do not think it necessary to repeat except to say that one inspector can still read 400 meters or more per day, and that our bookkeeper can still post 1,500 to 2,000 collections in a day from the cash book to the meter ledger or make out nearly that number of meter accounts and it can easily be demonstrated any time. This will not appear strange if the system is understood and I will take pleasure in explaining it to any one interested. I do not wish to take up the time of the Convention by repetition.

With regard to systems of bookkeeping. Ours was a private company and we were therefore at liberty to carry out our own ideas without being hampered by restrictions. I do not think one set form will do for all plants, private, and municipal, but that each must adapt his methods to the requirements. Many of the reports that I find of municipal plants seem to me to be mere padding and a waste of time, ink and paper. I do not think it adds to our knowledge to be informed how many crowbars, hammers or pounds of nails there may be on hand, but I do believe that any plant can with a moderate inventive ability, and a fair knowledge of bookkeeping have a system which will be adapted to its own special needs.

There is, however, one book which I think might be kept with advantage by all superintendents and water-works men, that is a scrap book or note book in which to paste or write any tables, formulas or other material likely to be of service as they are found in the various papers, periodicals and books and if nothing more to note in this book where to look for any desired information. I presume that my own scrap or note book will give me information which I would have to look through at least twenty books for if I wished to find it.

WOOD PAVEMENTS IN HULL*

HULL is making an experiment in wood pavements the results of which ought to prove interesting to every municipality desirous of obtaining the best material for paving its streets. Wood has many points in its favor as a material for street pavements. It is nearly noiseless, and is especially comfortable to the horses' feet. It can be laid as evenly as asphalt, and it has the merit of being less slippery than that material, an important feature in the pavement of the streets of many American cities where snow and ice are present during several months of the year. But wood also has its drawbacks, which some municipal authorities have found out to their cost, after having laid pavements of this kind without first investigating the subject and demonstrating which is the most suitable wood for the purpose and how it should be laid so as to get the best possible service out of it.

The experience of Hull is particularly valuable because the authorities appear to have made all proper tests and investigations, and to have reached the best results obtainable from present experience. These investigations began long enough ago to give by this time a fair test of quality and durability, and so present a comparatively complete lesson in this way.

Hull has now thirteen miles of wood pavement, and wood is being gradually substituted for granite blocks in streets originally paved with the latter material. The first experiment in wood paving was made in this city in 1875, English hard wood being used. The only native wood now used is "prismatic oak," and this is employed on gradients alone. Red deal from the Baltic ports, creosoted, was also laid in 1877. In 1902 a trial was given to "red gum" wood from the United States, but this has been generally discarded. The woods which have given the best satisfaction and are now coming into general use for street pavements are obtained in West Australia. They are known as Jarrah and Karri. The first trial strips of these woods were laid in 1894; and large areas began to be laid in 1898. They are still in good condition and will probably not need repairing for a number of years to come. Jarrah and Karri woods are of a dark mahogany color, and the blocks are sawed to the size of large bricks, the actual dimensions being 3 inches thick, 4⅜ inches wide, and 9 inches long.

The material used is not the sole reason why wood pavements have proved a success in Hull. The care with which they are laid has had as much to do with the result is anything else. First a foundation of cement concrete 7 inches thick is put down, which is faced with Portland cement mortar composed of three parts sand to one part of cement, forming a perfectly smooth surface for receiving the wooden blocks. These blocks, with one side and one end dipped in a hot mixture of pitch and tar, are laid close together, edge up, and the joints afterwards are run full of the mixture. On the top is sprinkled at frequent intervals a coarse grit, which tends to give a continuous surface almost as hard as granite.

The cost of the material for this pavement varies according to the wood used. Creosoted red deal blocks cost $1.38 and Jarrah and Karri $1.86 per superficial yard. Including the cost of foundation and of laying, these pavements cost when down $2.94 for creosoted deal and $3.42 for Jarrah and Karri per square yard. The first creosoted deal laid with close joints was put down in 1894. It has never been repaired and is still in very good condition, although under fairly heavy traffic. The Jarrah and Karri pavements appear as if they would not need repair for a number of years.

The cost of keeping these pavements in repair is not greatly different from the cost of keeping in repair the ordinary granite block pavements. The hardest granites are more durable, but their noisiness and the injury they cause to horses' feet make them objectionable. Another thing which makes the experiment with wood pavements in Hull interesting is the dampness of the atmosphere, which would tend to rot the wood. But they are laid with so much care and watched so continuously that this drawback seems to have been overcome.

* From United States Consul Hamm, Hull, England.

MUNICIPAL JOURNAL AND ENGINEER

Published Monthly by
THE MUNICIPAL JOURNAL PUBLISHING COMPANY
140 Nassau Street, New York

WILLIAM S. CRANDALL, - - - - - - - - Managing Editor
EMIL KUICHLING, C. E., - - - - - - - Engineering Editor

JOHN B. BENNETT, - - - - - - - - - Business Manager
E. J. BUTTENHEIM, - - - - - - - - - Assistant Manager
JAMES H. VAN BUREN, New York, - - - Eastern Representative

TERMS OF SUBSCRIPTION
(Payable in Advance)

United States and Canada	$3.00 per year
Foreign Countries	3.00 "
Single Copies, each	.25

Special rates given for clubs of ten or more.

Make all checks payable to The Municipal Journal Publishing Company

Entered at the New York Post Office as second-class matter

NEW YORK, JUNE, 1905

Philadelphia in Disgrace

On May 18th the City Councils of Philadelphia, by a vote of 111 to 13, accepted the bid of the United Gas Improvement Company for an extension lease of the city's gas works for a period of seventy-five years, upon the following terms: $25,000,000 in cash and $20,000,000 expended in improvements during that period. Under this bid the consumer will be obliged to pay $1 per thousand cubic feet for gas for the next twenty-two years, and 90 cents for the next fifty-three years thereafter. This bid was accepted in lieu of that made by the Edward B. Smith & Company, a syndicate of New York capitalists, who offered precisely the same amount in cash and for improvements—$25,000,000 and $20,000,000—and, in addition, offered one-third of the profits to the city for the first ten years and one-half the profits for the sixty-five years thereafter, allowing the city, if it so elected, to reduce the price of gas to 80 cents per thousand cubic feet immediately, and as the profits increased to reduce the price still more, to 70 or 60 cents, or even less.

For weeks the press of the city had been arrayed against the perpetration of this great wrong by the City Councils, finally appealing to the citizens to attend both sessions of the Councils at the time the measure was to be passed upon with the hope that the members of those bodies might be overawed by such a demonstration from their constituents and so compelled to act honestly by the city. That such a hope was vain will be seen by the following account of an eye witness of the scenes enacted in the council chambers and the corridors of the City Hall.

The proceedings of the committee and of the councils were accompanied by the wildest disorder witnessed in the Quaker City since the days of the Revolution. At 1 o'clock the finance committee received the report of the sub-committee, recommending the acceptance of the U. G. I.'s proposition. The crowd of citizens, eager to see that justice was done, made it rather difficult for the members of the committee to move about, while in the corridors without, hundreds pushed, tugged and trampled over each other in a mad effort to see what was going on inside. Some one in a spirit of fun started singing, "We'll hang Tom Dolan (President of the U. G. I.) on a sour apple tree," but the crowd was not in a joking mood, and when the several hundred voices took up the strain it was in a spirit of grim determination.

Inside the tension was great, and once or twice the chairman of the finance committee threatened to clear the room. The report, throwing out the Smith bid, was heard, however, with breathless interest. The reasons given were hazy. It was declared that the terms were not clear and what benefit the city would receive was defined in terms too problematical for consideration.

The crowd jeered, and when the chairman shouted: "I'll have you all thrown out," the sergeants at arms were not perceptibly enthusiastic. "Robbers!" shouted some one from the rear of the room, and from then till the close of the meeting similar jibes at the committeemen were made at frequent intervals.

When the report of the committee rejecting the Smith bid and approving the U. G. I. offer was read, a man in the rear wanted to make a speech in opposition, but the committee wouldn't allow it.

"Our time is limited," explained the chairman, "and we cannot hear you."

"Shame! Shame! Shame!" followed by a storm of hisses, greeted the chairman's assertion. "If you go on like this I'll fire you out," shouted the chairman.

"Try it," retorted the crowd.

The chairman thought better of his hasty decision and gave the spokesman of the committee of seventy a chance to be heard, who urged that the letter of Mayor Weaver, asking for a postponement of the whole matter, be read. At the mention of the Mayor's name the crowd hooted, and after his letter was read there was an awkward pause.

"Move to postpone consideration of the Mayor's message," said a committeeman. There was not a vote of dissent. Shortly afterward it was voted to present its report to the Councils without any recommendations.

The crowd, upon hearing this announcement, gave a howl of indignation, then moved bodily upon Councils. There were 2,000 of them by this time, and as they marched along the corridors singing, "We'll hang Tom Dolan on a sour apple tree," the echoes reverberated throughout the building.

There was a mad rush for seats in the galleries of both chambers, and a burly Irishman upon gaining a seat in the front row threw a rope over the railing to which was attached a sign: "This is for our councilmen." This was the signal for the others, and in an instant a number of ropes were dangling down.

As the councilmen took their seats those in the galleries above changed their lay to, "Hail! Hail! the Gang's all here."

"Order! Order!" shouted the president of the body.

"Shut up," retorted a galleryite.

"Clear the galleries," cried the president.

"Try it, you thieves," shrieked a dozen men.

Then the surprise of the day came when a councilman offered an amendment, under which the consumers will eventually get gas at 80 cents per thousand cubic feet. When the crowd learned that this figure would not come till 1956, pandemonium broke loose. "Thieves!" "Robbers!" "You thugs!" the crowd shouted. It was all the chamber could do to transact the routine of passing the ordinance, but it was finally passed by both chambers of the Council.

The councilmen who favored the U. G. I. proposition went home under strong police guard, with hooting crowds at their heels, while those who opposed the steal were treated with every consideration.

Thus Philadelphia, "the corrupt and contented," furnishes the world with another example of unparalleled civic corruption. In all probability Mayor Weaver will veto the ordinance, and then the Councils will pass it over his head. But, as we understand the law, it will require the Mayor's signature to make the lease with the city a valid contract, and it is hoped that he will be man enough to refuse that necessary part of the agreement and so defeat the purpose of the "Gang" and of the "Predatory Corporation."

There are three combined elements which make this shameful steal possible. First, the predatory corporation. This is made up of prominent gentlemen(?) of Philadelphia; men who, doubtless, are held in high esteem by most of their fellow citizens. They would not rob a bank nor tap a tradesman's till; they would not hold up either a rich man or poor man for the sake of obtaining the little cash he might have on his person; they would not betray their city or their country in time of war; and yet in this instance they have committed a worse offence. By corrupt methods they have obtained the city's consent to a long term lease which will enable them to take millions of dollars from the pockets of the people which rightfully they have no claim to. The New York "World" justly says:

"These men are anarchists—enemies of organized government. They are traitors. They are more dangerous to society than any criminal confined in a Pennsylvania penitentiary. They are more of a menace to the Republic than the anarchist scum of Europe which is dumped so freely upon hospitable shores. All that can be said in mitigation of their high crimes against society is that they are not alone. The directors of scores of other public corporations throughout the country are engaged in the same business of infamy and treason. These gentlemen are all great sticklers for the rights of property; yet they are doing more to bring on a war against property rights than all the disciples of anarchy and socialism that the country will ever import. They are doing more to raise up a generation that will appeal to force against corruption and cunning than all the incendiary orators between the Atlantic and the Pacific. They are doing more to overflow the principles of republican government than all the monarchs of Europe could do with their combined armies and fleets. These men, it must be frankly admitted, are the most dangerous elements with which the country has to deal."

The second element in this shameful scandal is the corrupt official—the purchasable servant of the people. In this instance he cannot be punished for he is doing the bidding of the machine. The machine is corrupt and he is therefore corrupt. Nominally, he is elected by the people; really, by the machine. The fact that he obeys the machine whip should be sufficient proof as to whom he considers his master—the machine or the people. When it comes to a question like this he practically says: "The people be damned! the machine elects me and I stand by the machine."

The third element involved is the voting power of Philadelphia. The statement is made on good authority that 55 per cent. of the better class of citizens let politics alone, and so permit the gang to rule by manipulating a majority of the remaining 45 per cent. of the voting population. If the so-called better citizen would do his duty as a citizen such an occurrence, as above recorded, would be impossible. And if he knows anything at all he must know this to be true. He must know, also, that if he chose to put himself to a little trouble, persistently, he could prevent the consummation of this bold robbery. If the gang wins out it will be the fault of the lazy, indifferent "better citizen," and Philadelphia will be getting, in that case, only what it deserves. May heaven help the honest official, the Mayor and the so-called better citizen to recognize their duty and do it!

Wanted: A Bureau of Municipal Information

WHATEVER may be the advantages of our decentralized system of local self-government, it has one serious defect—there is no adequate provision for the collection and distribution of information upon municipal matters. Each city proceeds independently and attempts to solve its problems in its own way, not because it is indifferent to what other cities have done or because it has no faith in their methods, but because it neither knows where the same problem has appeared elsewhere, nor has means at its disposal of ascertaining what success has been attained. Possibly, if the problem is one of unusual importance, a delegation from the city council or the chief of a department is sent upon a tour of investigation to see what other cities have done, to avoid their mistakes and to adopt successful methods. But this process is very expensive, sometimes fruitless and usually impracticable. The labor and expense are often still further increased by lack of information as to what cities should be visited. Remote location or a difference in language may constitute other barriers.

As a result there is waste, inefficiency, unnecessary experimentation and bad government. Not all waste and inefficiency are due to lack of information, but even an honest, energetic and progressive city official is often seriously handicapped by the inadequacy of his knowledge about other cities and other progressive movements. Private organizations and individuals interested in municipal affairs, in order not to appear ridiculous or to advocate mistaken policies, must also have the latest and most complete data. But their collection is often so expensive when the limited area effected is concerned that it is impossible.

The remedy for these conditions is a central bureau into which would flow from the cities of the world the publications they issue, specially prepared reports upon city problems, the periodic literature upon municipal affairs, the bul-

U OF M

letins of civic organizations—in a word, all the data in every conceivable form which would deal directly or indirectly with the character and administration of cities. This material would be appropriately catalogued, analyzed, digested and made available for every applicant. From this center there would flow to each public body, city department, organization and citizen a stream of information in reply to the inquiries he had made. For special reports, requiring unusual research and investigation, a moderate charge might be made to cover the exact cost of their preparation, the aim being not so much to furnish technical information, but to put every one in touch with the literature, the persons, the cities and the other sources of information, from which to secure the desired facts. Duplication of effort, experiments and investigations would thus be avoided and the experience of the world made readily accessible to all.

Every journal which deals with municipal matters will testify to the demand for such service. Their officers are bombarded with queries which they do not have the time to answer if they had the facilities for collecting the material. Chasers for information, often duplicating the work of others acting independently, pester city officials and citizens. Statistics are collected at great expense and labor by some one body only to be buried in their records, because they are not made known and accessible to the general public. Special libraries such as the Reform Club Library on City Affairs are collected at great labor and expense. But what is needed now is a Bureau of Research and Information and which shall focus the efforts and become the recognized center from which one may secure data on every phase of municipal ife.

The most natural location for such a Bureau is New York City. Its library facilities are unequaled. Here are the collections of the Reform Club, the Public Library, the Historical Society, the American Society of Civil Engineers, the Geographical Society, Columbia University and many private libraries devoted to special subjects. New York City is also the American city most accessible to Europe, the one always visited by prominent experts from abroad, the center of the publishing trade, of all movements of national scope and of business and commerce, so that here one comes more quickly, easily and directly into touch with those persons and sources of information most necessary to such a bureau.

Is there not some organization, some institution, some body of public spirited citizens or some single individual who will take hold of such a bureau and thus create a most effective agency for the betterment of municipal government. There is nothing which seems fraught with more promise to civic regeneration than such a plan. The Reform Club could perform no better service than the creation and maintainance of such a bureau in conjunction with its library — the best working library on city affairs in the United States.

The Asphalt Scandal

THE latest development of the Asphalt Trust Scandal shows how, for many months, the Trust has used the United States Government as a cat'spaw to pull its chestnuts out of the fire. Its evil influence over the Government began prior to the Venezuela episode and makes one of the most shameful stories of corruption in the history of Government affairs. The facts in the Venezuela case have been forcibly told in *Collier's Weekly* of May 13th, by Richard Harding Davis, who was sent to the seat of trouble for the express purpose of getting at the root of the matter. Every city official should obtain a copy of this number of *Collier's Weekly* and read the whole story, from which we make the following excerpts:

"Great as has been the effort to make it appear otherwise, this fight is not one between Castro and the United States. It is a fight between two rival American corporations, and it is being waged by men who have been discharged from one company or the other, or who have sold out one company or the other. The more clever ones have sold out both companies. For six years the struggle between these two companies has continued, and during that time men of national importance to the United States and to Venezuela have been dragged through the lake of pitch; until now, on one side or the other, are arrayed groups of dripping generals, diplomats, United States Senators, Venezuelan judges, and our First Secretary of State. Some of these men were bought with cash, some were bribed by jobs in front of rolltop desks, others by gifts of stock. Some sold out the company, nearly all are accused of having robbed it. What the National Asphalt Company itself did to the people of this country, who subscribed to its stock, is common history. Why should we believe that in a country as distant from the United States, and as frankly corrupt as is Venezuela, the Asphalt people have behaved any more honestly than they did in the city of Philadelphia?"

* * *

"The officers of the company (the Trust) claim that Castro's only reason for seizing their property is that he 'needs the money.' * * * The motive they attribute to Castro probably helped to make him act as he has done, but he had also a legal right to follow the same course. At least, it is that question which the courts of Venezuela must now decide. Mr. Hay desires to take this question from the courts and decide it by arbitration. His ultimatum was a final demand for this arbitration. Castro has refused to arbitrate. There the matter rests to-day."

After mentioning several minor reasons why Castro has acted as he has in this matter, Mr. Davis says:

"But the chief charge Castro makes against the company, and his chief reason for seizing its plant, is one more serious than that it has been lawless. It is a charge of treason. When the Bermudez Company sent arms to Venezuela with which to fight other Americans it was guilty of an act of insolent lawlessness; when it sent into Venezuela arms and ammunition with which to fight the Government itself, it committed an offence for which, according to the Constitution, the punishment is imprisonment and the confiscation of its property. It is to be decided in the courts whether the company did assist in the revolution against Castro. Castro certainly believes it did, and for that reason, until the courts decide the matter, he has placed the company in the hands of a receiver."

Mr. Davis gives the names and witnesses who assert that

the Bermudez Company is guilty as charged by Castro, and then refers to the latest development of the case, as follows:

"There has been introduced into the trouble a scandal which many people would have us believe in no way bears upon the attitude we have taken, or should take, toward Venezuela. This scandal is the charge made against the First Assistant Secretary of State, Francis B. Loomis, by our present Minister at Caracas, Herbert W. Bowen." * * * The accusation of Mr. Bowen against Mr. Loomis is that when the latter was our Minister in Caracas, he received bribes, and acted as a secret agent of the Bermudez Company. For the last two years, owing to the very fact that he had been our Minister in Caracas, Mr. Loomis has been consulted by the State Department as the authority in regard to our conduct toward Venezuela. If, then, it is true that he is a secret agent of the Bermudez Company, it is of interest to every American to know how much his advice and influence had to do with bringing the President and Mr. Hay to declare a war, the chief beneficiary of which would be the Bermudez Company."

After going further into the details of this point, Mr. Davis concludes by saying:

"Mr. Bowen's charges were filed at Washington before either Mr. Roosevelt or Mr. Hay left that city, and it does not seem likely that had they believed Mr. Loomis guilty they would have gone away leaving him in supreme authority at the State Department. It is said that before leaving Washington the only witness the President called in reference to Mr. Loomis, was General Avery D. Andrews, the vice-president of the asphalt company. This is the only really funny incident in this whole sordid scandal. It makes one fear that for the moment the President lost his sense of humor." The President is now conducting a quiet investigation with Mr. Bowen on the ground to assist in his own cause. The outcome will be watched for with interest.

It will not be satisfactory to the public if the President does not go further in his investigation than to consult his personal friends who happen to be so closely connected with the Asphalt Trust, no matter how much he may believe in their integrity. He must go to the bottom and he should let the public know the result, no matter where it strikes. That this is the view generally taken by the press throughout the country is shown by the following excerpts from editorials of some of the leading papers. In its issue of April 27th, the Boston *Herald* said:

"Some of the warmest supporters of the administration maintain that the affairs connected with the asphalt company, which long have been making so much bother for us in that part of the world, are altogether a disreputable mess, and that the concern is entitled to no sympathy from honest men or an upright government."

The New York *World* said in concluding a recent editorial:

"Before President Roosevelt goes further with his campaign against Castro he should overhaul the Asphalt Trust's record abroad. At home it has been involved in municipal scandals and financial bankruptcy. Ultimatums and warships might wait until the Venezuelan courts have spoken."

The New York *Sun* pertinently said on May 23rd:

"The representatives of the asphalt interests, among whom Mr. John Bassett Moore, formerly Assistant Secretary of State, is conspicuous, are desirous of impressing the Administration and the public with the idea that the whole proceeding in the Venezuelan courts has been a travesty of justice.

"That may be. The time to consider that question is after the local courts have got through with the business. No ultimatum need be launched and no warship unleashed just at present.

"Meanwhile, it is proper to say in a spirit of candor that whether the whole proceeding in the Venezuelan courts has been a travesty of justice or not, an impression prevails here at home that much of the history of the Asphalt Trust, this persistent appellant for national support by big stick and ultimatum and battleship, has been a travesty of common honesty."

Shall There Be Pipe Galleries in the Subway?

THE New York State Legislature passed a bill at its last session providing for the introduction of pipe galleries in all extensions of the Subway, empowering the Rapid Transit Commission so to act in the granting of all franchises for such extensions. Naturally such a bill would receive opposition from the local corporations, because it would destroy the monoply now enjoyed by them in subway conduits for lighting and telephone service. By some it is contended that the new legislation is abortive in that it leaves the Commission without power to act in the matter, while others are equally positive that the Commission has full power to proceed with comprehensive plans to protect the City's interests.

The Hon. Jacob A. Cantor, former President of the Borough of Manhattan, has closely followed the rapid transit legislation and consented to give his opinion upon the question. To a representative of THE MUNICIPAL JOURNAL he said:

"I am glad to know that the Legislature has at last authorized the construction of pipe galleries in connection with future subway extensions. The Gardner Bill, just passed by the Legislature and now in the hands of the Governor for approval, gives the Rapid Transit Commission authority to build pipe galleries. Heretofore there has been no express authority for their construction and this enactment is a point gained, and a long step in the right direction. The Bill authorizes the Commission to contract for such construction, to set aside certain sums for such construction, and, further, that the pipe galleries shall remain independent of the operating contract for the roads. This will give the city full control and create a municipal system of inestimable value.

"There are some who contend the nothing is gained by the new legislation, because the measure does not provide for the use and management of the pipe galleries after construction. But why cross the bridge before reaching it? After the pipe galleries are built, or during construction, any additional needed authority can be easily secured by the Commission.

U of M

"To be of any great advantage to the city a system of pipe galleries must be provided for at once. If no provision is made by the Commission, at this time, it will mean the death of pipe galleries for the future. There can be no delay to await further legislation for the plans and the contracts for all extensions must soon be settled.

"The Commission is already committed to a system of pipe galleries, owned and operated by the city, and when the Governor has approved the Gardner Bill, now before him, the Commission will have received all necessary authority to construct such pipe galleries wherever desirable. The Commission certainly has the right to determine the matter offhand in favor of the city, or, if there be any doubt, it should give the city the benefit of the doubt."

What the Commission will do in the matter is problematical, for, to say the least, it has not manifested, thus far, an overzealous desire to secure fair deals for the city. It is hoped that it will accept this opportunity to obtain something which cannot fail to be of lasting benefit to the city as well as to the citizens who are so universally oppressed by overcharges for light, power and telephone service. The ownership and operation of pipe galleries by the city would break the backbone of the telephone monopoly and bring about a reduction of the price of electric current, for power and lighting purposes, inasmuch as such ownership and operation would admit of real competition.

League of American Municipalities

The next meeting of the League of American Municipalities, which is to be held at Toledo, O., August 23-25, 1905, promises to be the most interesting session in its history. Secretary MacVicar announces the following preliminary program:

"Municipal Finance and Accounting," by L. G. Powers, Chief Statistician, Department of Commerce and Labor, Washington, D. C.

"St. Louis' Municipal Lighting Plant," by J. W. Wood, Chief Engineer.

"How to Tax Real Estate," by Peter Witt, City Clerk, Cleveland, O.

"Workhouses," by Frank R. McDonald, Superintendent Minneapolis City Workhouse.

"Municipal Ownership," by Robert H. Jeffrey, Mayor, Columbus, O.

Address (Subject to be announced), by F. S. Spence, City Controller, Toronto, Can.

"Abatement of the Smoke Nuisance," by R. P. King, Smoke Inspector, Indianapolis, Ind.

"Should Disinfectants be Standardized," by Wm. S. Crandall, Editor, Municipal Journal and Engineer, New York City.

Paper (Subject to be announced), by Oscar Leser, Judge Appeal Tax Court, Baltimore, Md.

"Factors in Asphalt Paving Construction, Maintenance and Cost," by Andrew Rosewater, City Engineer, Omaha, Neb.

Address (Subject to be announced), by Chas. A. Hague, C. E., New York City.

Editorial Comment

A Municipal Exhibit.—For the first time in the history of the various national municipal organizations there is to be an exhibition of municipal supplies worthy of note. This exhibition will be held in connection with the twelfth annual convention of the American Society of Municipal Improvements and is described more at length, by the president of the society, elsewhere in this number. We wish simply to emphasize the importance of such an exhibit and to call it to the attention of our readers and our advertisers generally. The exhibit together with the program of the convention will form one of the most important municipal gatherings ever held on this continent. It will be well worth the expense, time and trouble for the principal cities of the United States to send representatives to this convention, which will be held at Montreal, Canada, on September 5th, 6th, 7th, 8th and 9th. Those wishing fuller particulars relative to the convention should address Mr. Alcide Chausse, Alliance Building, St. James street, Montreal, Canada; those wishing information about the exhibition should address Mr. J. W. Ritchie, at the same address.

Michigan's New State Highway Department.—After many days and after a long and strenuous fight put up by the "Good Roads Senator," former State Senator Earle, Michigan has obtained a State Highway Department worthy of its greatness. An abortive effort was made in this direction two or three years ago, when Senator Earle was appointed State Highway Commissioner, but without a salary or adequate provisions for carrying out the spirit of the new law. The bill by which the present State Highway Department has been created and established provides for the appointment of a State Highway Commissioner and assistants, for a system of State co-operation with townships and counties in the improvement of the public wagon roads and an appropriation therefore, so that the State Commissioner will no longer be obliged to work gratis. To carry out the provisions of this act an appropriation of $60,000 is made for the year ending June 30, 1906, and for the year ending June 30, 1907, $110,000; of which amounts $10,000 only shall be used for the running expenses of the department each year, the balance being expended for encouraging the improvement of the public wagon roads. The Municipal Journal wishes Senator Earle abundant success in the administration of this new department, and congratulates Michigan upon securing the services of so efficient and enthusiastic an official.

New York's Light Investigation a Fizzle.—As we predicted in the May issue the investigation of lighting conditions in New York City by a Legislative committee has ended in a practical fizzle. Besides the report of this committee, which recommended fair reductions for city and private lighting by both gas and electricity, there were several bills, the purpose of which was to better the quality of the light and reduce the price to the public and private consumer. Instead of accepting the recommendations of the committee, the Legislature created a State Lighting Commission with which it is promised to correct the lighting evils of New York and other cities in the State. Any-

thing in the way of a reduction of the price paid for gas and electricity will be a gain, but many months will elapse before anything of the sort can be realized, for Commissions travel slowly even when honestly created; there is little hope of relief from this State Lighting Commission because it is a partisan affair and only intended to pull the wool over the eyes of an unsuspecting public. New York City is almost as long suffering in its endurance of wrongs by the public service corporation as Philadelphia. It gives an effective kick about once in twenty-five years, while Philadelphia's record is once in a hundred years.

WATER-WORKS CONVENTION.—The twenty-fifth annual meeting of the American Water-Works Association was held at West Baden, Ind., May 8th to 13th, inclusive. The attendance was fair and the interest shown in the papers and discussions was up to the average of previous meetings. Several of the papers are published in full in this number. The amusements for the members and their guests were of a greater variety than usual and, taken as a whole, the meeting was as pleasant and profitable as any ever held by the association. Boston was selected as the next meeting place. The officers elected for the ensuring year are as follows: President, Benjamin C. Adkins, water commissioner, St. Louis; first vice-president, Charles E. Rowe, superintendent water-works, Dayton, O.; second vice-president, Dabney H. Maury, consulting engineer, Peoria, Ill.; secretary-treasurer, John M. Diven, superintendent light and power company, Charleston, S. C. The exhibit of water-works appliances was larger than usual and a list of the companies represented will be found elsewhere in this issue.

Personalities

—Mr. J. P. Harper has been elected city engineer of Pine Bluff, Ark.

—Mr. John A. Jones, city engineer, of Lewiston, Me., has been re-elected.

—Mr. Arthur Reimer has been appointed superintendent of the water-works of East Orange, N. J.

—Mr. Harvey Linton has been re-elected city engineer, and Mr. Thomas C. Hare elected city solicitor, of Altoona, Pa.

—Mr. Lee L. Harper has been appointed city engineer of Belleville, Ill. Mr. Harper was formerly city engineer of East St. Louis, Ill.

—Mr. Herbert A. Holstein, assistant city engineer, of Dunkirk, N. Y., has been appointed civil engineer for Titusville, Pa.

—Mr. B. J. Arnold, M. Am. Inst. El. E., has been appointed consulting engineer for the proposed municipal street railway system by the city of Chicago, Ill.

—Mr. B. J. Dalton has resigned his position as city engineer of Lawrence, Kan., and has taken a position in railroad work. Mr. Dalton's term of office as city engineer will be completed by Mr. E. E. Trueblood.

—Mr. Fred Crandell has resigned his position as city civil engineer of Muncie, Ind., to accept a position in the engineering department of the Great Northern R. R. and will be located in Spokane, Wash. Mr. Crandall has been succeeded by Mr. John O. Potter.

—Mr. R. Sterling has been elected city engineer of Wardner, Idaho.

—Mr. A. E. McIntosh has been appointed city engineer of Pueblo, Colo.

—Mr. Bryce R. Blair, city engineer, of Carbondale, Pa., has been re-elected.

—Mr. T. G. Elbury, city engineer, of Hutchinson, Kan., has been re-appointed.

—Mr. J. B. Coleman, city engineer, of Winona, Minn., has been re-appointed.

—Mr. C. H. Mulholland, of Pittsburg, has been elected city engineer of New Castle, Pa.

—Mr. Arch P. Smith, city engineer, of North Tonawanda, N. Y., has been re-appointed.

—Mr. Edwin Jerome has been elected village engineer of Fairview, Wayne county, Mich.

—Mr. Joseph W. McNeil has been appointed city engineer of Alpena, Mich.

—Mr. Samuel Gaily, superintendent of the water-works of Altoona, Pa., has been re-elected.

—Mr. Frank Gridley has been appointed assistant city engineer of Troy, N. Y.

—Mr. John Burns has been appointed superintendent of the water department of Titusville, Pa.

—Mr. J. P. Jasperson, superintendent of the water-works of Neenah, Wis., has been re-elected.

—Mr. James F. McCabe has been the fourth time reappointed city engineer of Topeka, Kan.

—Mr. Alonzo Kendall, of Medford, Mass., has been appointed highway engineer at Lenox, Mass.

—Mr. Bert C. Crowell, superintendent of the water department of Methuen, Mass., has been re-appointed.

—Mr. Albert W. Hall, city engineer of Flint, Mich., has resigned to accept a position with the Massillon Bridge Co.

—Mr. John B. Hawley has been re-appointed city engineer for the fifth consecutive two-year term at Fort Worth, Tex.

—Mr. William F. Williams has been re-appointed city engineer, and Mr. C. F. Lawton, superintendent of public work, of New Bedford, Mass.

—Mr. Robert L. McAlpine has been elected city engineer of Kansas City, Kan., and Mr. Henry S. Swingley, street commissioner.

—Mr. R. H. Thompson, city engineer, of Seattle, Wash., has started on his trip throughout this country and abroad to study municipal problems in the various cities.

—Mr. F. W. Blocki, former commissioner of public works of Chicago, who was recently elected city treasurer will be succeeded by Mr. Joseph M. Patterson.

—Mr. R. H. Ashworth has been elected city engineer of Colorado Springs, Colo., to succeed Mr. E. W. Case, and Mr. W. H. Brenton has been appointed assistant city engineer.

—Mr. Charles G. Poetsch has been re-elected city engineer of Milwaukee, Wis., and Mr. Vincent J. Schoenecker has been elected commissioner of public works. Mr. Poetsch has been connected with the engineering department since 1878 when he was appointed assistant city engineer, and is now ex-officio president of the board of public works.

—Mr. F. A. Gill, city engineer, of Spokane, Wash., has resigned.

—Mr. Ira W. Sylvester has been elected city engineer of Alexandria, La.

—Mr. Frank Shutts has been appointed city engineer of Saint Charles, La.

—Mr. Frank B. Gridley has been appointed assistant city engineer of Troy, N. Y.

—Mr. Frederick L. Ford, city engineer, of Hartford, Conn., has been re-appointed.

—Mr. David Morey has been appointed superintendent of the water-works of Troy, N. Y.

—Mr. Louis P. Wirthwein, an assistant city engineer of Columbus, O., died at his home in that city.

Mr. Alonzo Kendall, of Medford, Mass., has been appointed superintendent of highways of Lenox, Mass.

—Mr. Alfred S. Burgess has been appointed assistant engineer by the Aqueduct Commission of New York, N. Y.

—Mr. Peter E. Van Buskirk, borough engineer, of Rutherford and Oradell, N. J., died in his home in Rutherford, April 27.

—Mr. Oscar Erlandsen has resigned his position as assistant engineer of the department of bridges, New York City.

—Mr. Roswell D. Cooper, of Little Falls, N. Y., has been appointed assistant engineer and inspector of public works of that city.

—Mr. J. W. Link has been appointed assistant engineer on water purification and sewage disposal in the department of public serice, Columbus, O.

—Mr. Joseph L. Bayne has been appointed assistant pavement engineer in place of Mr. Myron B. Vorce who was appointed building inspector of Cleveland, O.

—Mr. D. D. Thorp, water commissioner, of Detroit, Mich., has retired from that position and Mr. John F. Dodge has been appointed to fill the vacancy.

—Mr. Henry L. Merker, who was former city engineer of Belleville, Ill., has accepted the position of manager of the Enid Electric and Gas Company, of Enid, Okla.

—Mr. William Carroll, who was first assistant city electrician of Chicago, Ill., has been appointed city electrician to fill the vacancy made by the resignation of Mr. Edward B. Ellicott.

—Mr. Fred Giddings, city engineer, of Atchison, Kan., has been re-appointed. Mr. Giddings has been city engineer of Atchison since his first appointment in 1885 with the exception of one year.

—Mr. Joseph M. Birmingham, president and superintendent of the water board of Hartford, Conn., has been re-elected, and Mr. W. E. Johnson has been appointed engineer in charge of the reservoirs.

—Mr. W. J. Crocken, city engineer, of East St. Louis, Ill., has been re-appointed, and Messrs. George H. Meek, W. A. Thompson and R. B. Leivey have been appointed assistant city engineers.

—Mr. F. O. Sinclair, M. Am. Soc. C. E., succeeds Mr. F. R. Crandall as superintendent of water-works of Burlington, Vt. Mr. Crandall, who has held that position for the last seventeen years, will open an office with Mr. H. M. McIntosh in Burlington and will engage in general engineering work.

—Mr. D. L. Ellis resigned his position as city engineer and engineer of the water department with the outgoing administration of Great Falls, Mont., and will take up the management of the Ellis-Ford Pipe Cutter Co., of that city. Mr. Ellis will be succeeded by Mr. George W. Bird, former deputy county surveyor.

American Society of Municipal Improvements

A. PRESCOTT FOLWELL, President, ... Easton, Pa.
GEORGE W. TILLSON, Secretary, . . . Municipal Building, Brooklyn, N. Y.

To the municipal official who visited the St. Louis Exposition one of the most interesting features was the collection of exhibits, assembled in the Model street, the best of these being that of New York City. The value of this display suggested the desirability of more frequent, or of permanent exhibits of this nature; and Chicago has started a permanent Municipal Museum which has attracted considerable attention and drawn forth only favorable comment, using as a nucleus for this a large part of the exhibits which were at St. Louis.

The American Society of Municipal Improvements intends to hold in connection with its convention in Montreal, in September, a temporary exhibition along similar lines. All the associate members are requested to bring there and display such goods as they think would be of interest to the corporate members, and it is believed that this will be of mutual advantage to both exhibitor and municipal official. The corporate members are to be put to no expense except that of bringing their goods to Montreal and arranging their display, unless a large space is desired by some one exhibitor, when a nominal sum will be asked for the additional space. The exhibit will be held in Crystal Rink, with a floor space of 96 by 112 feet, and will be open for five days. Here it is hoped that members may have an opportunity to see, and examine, and make thorough inquiries concerning tools and materials for constructing pavements, sewers, water-works, conduits, and all the appurtenances thereof; for repairing, cleaning and sprinkling streets, disposing of garbage, sewage and other municipal wastes; and a great variety of other municipal utilities.

For the convention meetings there is promise of a number of very interesting papers, and it is hoped that brief synopses of these can be sent to all members three and four weeks before the convention, with the idea of stimulating discussion as well as of attracting a larger attendance.

A preliminary arrangement of the program has been made as follows:

Tuesday, September 5th—Formal opening of convention and exhibit; business meeting; reading papers.

Wednesday, September 6th—Social day. Rides through Montreal; luncheon given by the Corporation of Montreal; trip through Lachine Rapids. Evening, business meeting and reading of papers.

Thursday, September 7th—Reading of papers morning

and afternoon. Close of the convention proper. Banquet in the evening.

Friday, September 8th—Visiting day. Members and guests may visit all municipal plants, etc., in Montreal.

Saturday, September 9th—Exhibition day. Closing day of the exhibition; which, however, can be visited at any time throughout the week.

Applications for membership in the society this year have already greatly exceeded the number received during any year since the first two or three after its organization, and the prospects of the society are unusually bright.

Convention Dates

June.

—American Institute of Electric Engineers, Asheville, N. C., June 19-23. Ralph W. Pope, secretary, 95 Liberty street, New York.

—American Society of Civil Engineers, Cleveland, O., June 20-23. Charles Warren Hunt, 220 West 57th street, New York.

—National Good Roads Association, Portland, Ore, June 14-17. R. W. Richards, Omaha, Neb.

—National Park Superintendents' Association, Buffalo, N. Y., June 28-30. J. F. Colwell, Buffalo, N. Y.

July.

—National Conference of Charities and Correction, Portland, Ore., July 15-21. Alexander Johnson, secretary, 105 East 22d street, New York.

August.

—League of American Municipalities, Toledo, O., August 23-25. J. McVicar, secretary, Des Moines, Ia.

October.

—American Civic Association, Cleveland, O., October 4-6. Clinton Rogers Woodruff, secretary, 121 South Broad street, Philadelphia, Pa.

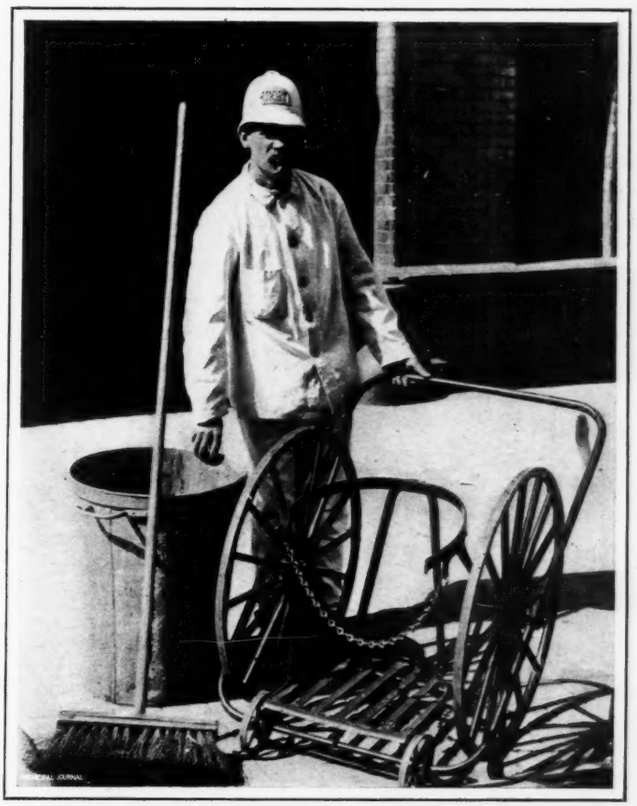
December.

—American Economic Association, Baltimore, Md., December 26-30. Frank A. Fetter, Morril Hall, Ithaca, N. Y.

New York's Can Carrier Street Cleaning System

WITH a force of 1,736 street sweepers, or "White Wings," constantly at work removing objectionable matter from the streets of Manhattan and the Bronx, and an additional force of 500 performing similar duty in the big Borough of Brooklyn, the Street Cleaning Department of the great city has decided, after careful and exhaustive experiments with various systems, that the plan of utilizing can carriers, small hand trucks, of skeleton framework, for carrying individual cans, is the best adapted to the street cleaning needs of the metropolis. The system, introduced by Colonel George B. Waring on a small scale, has been extended, until at present there are about 8,000 cans in daily use, each sweeper having three or four which he keeps in use with one carrier.

Each sweeper leaves his district headquarters in the morning with his cans "nested" in the carrier, and trundles the load to the scene of his operations. There he works all over the street until he has enough refuse and dirt to fill one of the cans, which he takes from the nest, fills, and leaves by the curb. He continues this process until his last can is filled, and by that time one of the Department teams has begun business by emptying the cans and leaving them ready for more sweepings by the curb. Then the sweeper begins all over again, and before the team has disposed of its load and returned to the beat the cans are again filled. Of course the amount of street surface kept clean by one man varies with the district and the amount of traffic and cleanliness of its inhabitants, and while on some of the uptown streets three cans are enough for a man, and one going over in a day will keep the roadway in fairly good condition, in the downtown East Side section, the Ghetto, as it is called, where the streets are made a dumping ground for anything and everything the people have a desire to be rid of, four



"THE TWENTIETH CENTURY STREET CLEANING CAN AND BAG CARRIER," MADE BY WRIT & KNOX MFG. CO., PHILADELPHIA

cans are none too many, and the carrier is in almost constant motion. That neither the cans nor the carriers receive gentle treatment at the hands of the "White Wings," may be inferred from the fact that while there are about 2,250 carriers in use and the supply of cans runs up to about 8,000, they are ordered in 5,000 lots, the whole supply having to be renewed at least once in a year.

Both the carriers and the cans are made at the Sing Sing State Prison, at Ossining, on the Hudson, and a large number of the prisoners find steady employment in their manufacture. As the expense to the city is made up the cost of the materials used, the labor of the prisoners, and the royalty paid to the patentees of the carriers and cans, a large saving is effected by having the State's hostages do the work.

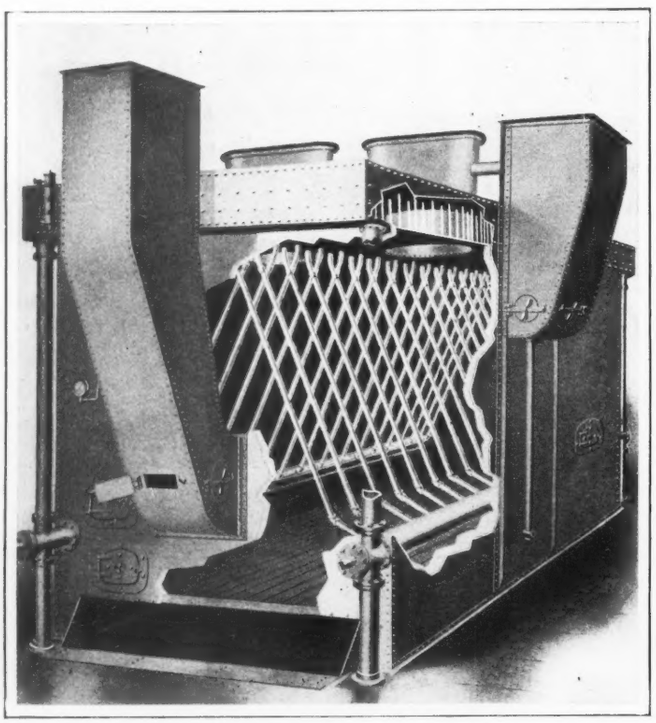
Many reasons are advanced for the success of the can and carrier system, among them being ease and celerity of handling, comparative freedom from the dust caused by

the big machine sweepers, possibility of dividing the street sweepings into classes of material when needed, and facility in reaching the narrow streets and alleys where the wagon service could not be used to advantage. Great hopes are expressed by the department officials that the life of the cans will be materially increased by the substitution of a heavy steel bottom in the cans for the thinner one heretofore used, and an order for 5,000 recently placed will, it is believed, have the increased weight more than compensated for by the gain in efficiency.

Atlanta's New Garbage Incinerator

The city of Atlanta, Ga., has had a new garbage incinerator in operation for several months, which, according to report, has worked satisfactorily, as to economy and efficiency.

The plant is so constructed that all garbage or other matter intended for destruction is dumped directly into the incinerator so that no further handling is required. All wet garbage and refuse is held on the upper water circulating tubular grates, immediately over the bright fire on the lower



SECTIONAL VIEW OF THE DECARIE INCINERATOR

grate, so that the flame and heat on their way to the flue, pass directly under and through the wet mass, which evaporates the moisture and dries the matter before it falls onto the lower grate fire, where it adds fuel to the flame and is itself consumed. By this provision the smothering of the fire is prevented and the creation of noxious odors and gases avoided. All smoke and gases, not consumed in the incinerator proper, are passed through the auxiliary gas consuming furnace, where, by means of flame and water, all mineral dust and noxious odors are eliminated so that nothing but a clean, white, dry, odorless vapor is emitted by the stack.

The lower grate area represents the full size of the incinerator proper, while the upper grate area is twice the size of the lower. The stack is of such a size and height as to insure ample draft and rapid and thorough combustion. The interior construction is of such a character as to meet all requirements, such as strength, contraction and expansion, circulation of water, non-clogging or burning out of pipes, durability and the ease and rapidity with which repairs may be made when necessary.

The lower grates are of cast iron, 50 per cent. metal and 50 per cent. openings, the openings between the lower grate bars being from ⅝ to 1 inch, which insures complete incineration before the ashes fall through to the ash pan. It is reported that a residue of only thirty pounds of ashes per ton of garbage and refuse is obtained.

All liquids find their way, by gravity, to the evaporating pan, located under the lower grate, where it is evaporated by steam heat. The pan is of a boiler character and stay-bolted to withstand steam pressure, and is connected with steam and water space which forms the crown. Every drop of liquid in garbage is evaporated by the Decarie system in a sanitary manner.

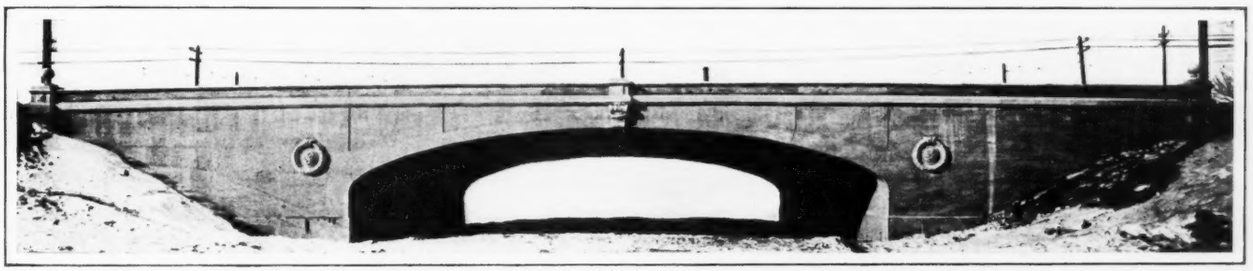
The Atlanta plant was installed by the Decarie Manufacturing Company, of Minneapolis, Minn. The company reports that it installed a similar plant for the city of Minneapolis about four years ago and that it has been operated with marked success since that date, at an expense of 25 cents per ton of refuse destroyed, while the necessary repairs to the plant during that period have amounted to less than $20. The cost of incinerating matter in the Atlanta plant the company places at 20 cents per ton.

Liquor License in Halifax.—For the first time in many years it will be legal to drink a glass of beer or whisky in a barroom in the city of Halifax. A liquor license bill for the city, proposed by the Halifax aldermen, has been passed by the legislature. It is a complete reversion of the provincial license law, and was bitterly opposed by the temperance people. Under the new amendments a scale of high license fees is adopted. The hours for selling are extended from 9 to 10 o'clock at night, except on Saturday, when the time is extended from 6 o'clock in the evening till 9 o'clock, and selling by the glass is made legal. The city council guaranteed in effect that if these amendments were passed the law would be strictly enforced, including the prohibition of Sunday selling.

Salt Water Fire Protection System for San Francisco.—Condemnation proceedings have just been commenced by the city of San Francisco to acquire property necessary for a reservoir site on Twin Peaks. Over a year ago the Supervisors determined to give the city of San Francisco a salt water fire protective system, and appropriated $150,000 as the first instalment for the work. It is not until the present time, however, that any definite steps could be taken further than surveying the ground for a reservoir site and getting the prices on materials. The owners of the property hold out for exorbitant prices; and while for a considerable time it was thought that a compromise could be made with them, it eventually developed that nothing could be accomplished except by condemning the property required.

Concrete Bridges at Newark

THERE has been just completed on Bloomfield avenue, Newark, N. J., for the Essex County Park Commission, a concrete bridge of the Melan type of construction with reinforcing bars having a rise of 8½ feet, at a cost of $33,000. The width over all is sixty-six feet, with a 40-foot roadway and two 13-foot sidewalks. The bridge has a span of seventy feet. The thickness of concrete at the center of arch is nineteen inches, increasing to four feet at the hanch. Under each abutment 184 piles twenty-five to thirty feet long were driven, quicksand having been found. Alpha cement was used entirely in its construction. The bridge has an opening below with a 40-foot driveway, a 15-foot sidewalk and a 15-foot waterway, with a headroom of fifteen feet from roadway to center of arch.



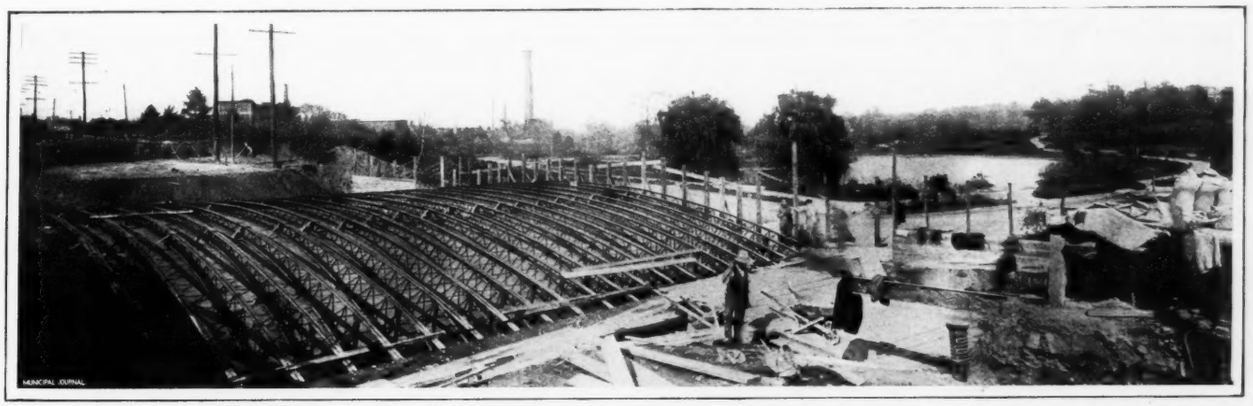
REINFORCED CONCRETE BRIDGE, NEWARK, N. J.—COMPLETED

Bloomfield avenue is one of the county roads (very heavily traveled) leading from the city of Newark to the towns of Bloomfield, Montclair and Caldwell. This bridge, with its mate, now under construction at Park avenue (with a span of 132 feet, said to be the largest concrete bridge of the Melan type built in the United States), are the connecting links to three parks forming the beginning of the park system of Essex County, upon which over $4,000,000 have been spent and another $1,000,000 appropriated.

The exposed concrete surface of this bridge has been tooled, thus doing away with the ordinary dead finish of the cement and presenting a handsome appearance. The contractors were Schillinger Bros. Co., Chicago, W. A. Hoyt, constructing engineer, in charge.

Ideal Park Conditions*

IN the new McKinley Park more than 121,000 men, women and children used the swimming pool during the season of 1904. This park is four miles from Lake Michigan, the bathing beaches of which might as well not exist in so far as they are serviceable to the hot and work-worn people of the Brighton district. That these people might enjoy the healthful luxury of bathing, an out-of-door concrete tank was built, 350 feet long, 150 wide, and sloping to a depth of nine feet. The water is tempered artificially, and the pool is surrounded with plantation effects. Dressing rooms and bathing suits are furnished free. Approach to the pool is through an Ionic colonnade of stone, roofed with a flower garden. Within the colonnade is a shower-bath house, where patrons are cleansed before entering the public water. The pool has proved itself an undisguised blessing to the working people of the McKinley Park region. This district is familiar to the public, for it lies out on the "Archey" road, made famous in the Dooley papers.



PARK AVENUE BRIDGE, NEWARK, N. J.—RECENTLY COMPLETED—REINFORCED CONCRETE

In addition to the swimming pool, each park has a shallow wading pool for children, and a sand pit where they may play. Each also has swings, giant strides and other athletic apparatus.

In all the parks are running tracks, and all have outdoor gymnasia, for supplemental service in summer. For the wise and systematic use of the gymnasia the commissioners have employed a director, a graduate of Harvard. This

* From Henry G. Foreman's "Chicago's New Park Service" in the February *Century*.

officer will give instruction, assist in organizing neighborhood clubs, encourage athletic rivalries and make exercise attractive.

Such, briefly, is the service the commissioners afford in the new club houses. All is free to any person who conducts himself or herself properly.

The buildings vary in size with the neighborhood and the area of the parks or squares. The walls are a concrete of Portland cement and crushed limestone. In the surface finish small particles of stone are visible, making the wall rough instead of flat and meaningless. The ornamentation also is concrete—pilasters and pillars with classic capitals. The roofs of the buildings are gray-green tile. The eaves are stained red, relieved by the whitened ends of the rafters.

The park building is placed near the promenade and the concert grove, the outdoor gymnasia for both men and women, and the natatorium.

The large feature is the assembly hall, shared by men, women and children as a shelter, and arranged for lectures and entertainments. The ceiling is high, showing open timbers. A stage is provided, and, in close communication, a refectory, a retiring room for women and a smoking room for men.

Flanking this hall are the wings accommodating the social and athletic functions for men and women respectively. From the wings the hall is separated by entrance vestibules, controlled by attendants' offices and opening into the locker room, the public toilets, and the staircases leading to a second story. Here are arranged the club rooms, library and class rooms.

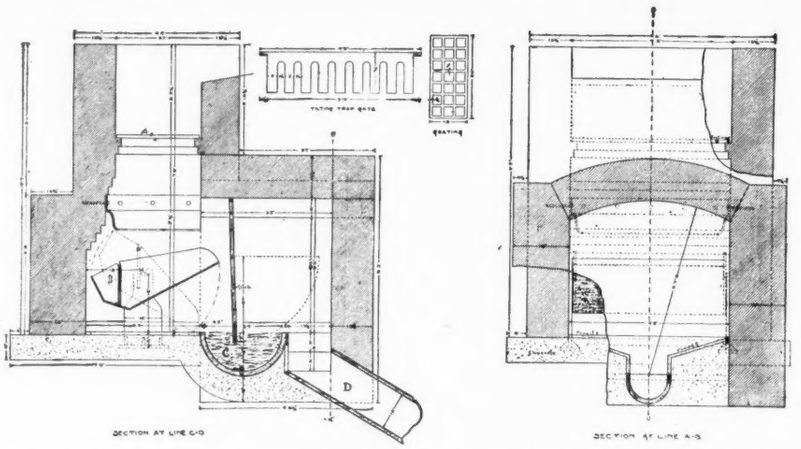
The out-of-door swimming pool is screened by the main building and by vine-covered pergolas, is arranged with a southern exposure, and is inclosed by walls on the north, thus gathering and reflecting the sun's rays. This raises the temperature and prolongs the bathing season. Flowering shrubs, vines and lawns enrich the pool inclosure, and stretches of sand invite the swimmers to enjoy sun baths.

The dressing booths, in extended rows, are removed from the main building, and are controlled by a special office. From the booths the swimmer passes to the pool through a shower bath, where there are soap and brushes. Adjoining the booths is the laundry, with the heating service. There also is a hair-drying room for women.

The building and pool in the smallest of these squares occupy an acre. In the larger squares and parks the area is considerably greater. Each building is designed to fit well into the landscape of the park. The average cost is about $90,000.

A New Automatic Sewer Inlet

A NEW automatic sewer inlet or trap has been patented and consists of a grating or mesh at *A* (see diagram) to catch sticks and large refuse that may be washed into the inlet; a bucket gate, *B*, in a tilting trap which holds sufficient water to flush the inlet; *C* is a seal filled at all times with water, and which shuts off the escape of sewer gas,



and *D* shows the sewer trap from the inclined shoot to the sewer proper. In operation, the sewage or flush flows into the inlet, through the screen into the tilting trap which, when sufficiently filled automatically discharges its contents with sufficient force to pass it directly to the sewer through the second trap, which, however, retains sufficient water to form a seal against escaping gas. The screen, or mesh, is near the surface and is readily cleaned.

The invention has been satisfactorily tested by the city of McKeeport, Pa., and will probably be adopted by the Board. The patentee is Mr. Joseph Pratt, of that city.

English Tramways

MR. L. B. HALL, of Grand Rapids, Mich., in a talk on "Municipal Tramways in Great Britain," give some interesting facts. He said:

"At the present time the number of street railways owned by the municipal authorities and those owned by private companies are about equal, though the capitalization and mileage of the municipal enterprises are much greater. When it comes to the actual operation of trams, it is very nearly a stand-off between the municipal and private systems. The following table will give a view of the street railway situation in the United Kingdom at the close of 1903:

STREET RAILWAYS IN GREAT BRITAIN AND IRELAND

	Municipal	Private
Systems **owned**	142	154
Capital invested	$122,000,000	$86,000,000
Miles open	1,067.75	704.50
Cost per mile	$114,560	$122,010
Systems **worked**	86	108
Capital invested	$103,000,000	$101,000,000
Miles of track operated	890	874.25
Ratio of expense to income	63.57%	73.61%
Equivalent return on capital	7.34%	4.75%

"The benefits of municipalization in London are set forth as follows: Municipal ownership has benefited not only the general body of rate-payers, but also the tramway employees. Both the services, and the status of the workmen, have been improved. A brief enumeration of the advantages conferred upon London in both these directions is as follows:

"1. The relife of rates from the profits of the undertaking.

"2. The institution of all-night car services.

"3. The running of workmen's cars at reduced rates.

"4. Reduced fares for ordinary passengers on many of the principal routes.

"5. The removal of advertisements from the windows of the cars.

Tramway Statistics of 36 Cities and Towns.

CITY	Population.	Miles of Streets with car lines.	% of gross receipts used in operating.	% of net receipts to capital invested	Surplus (*) or loss (†) after paying interest and rental charges.	Capital investment per mile of route.	Average Fare per passenger in cents.
Aberdeen.	157,000	12.02	52	9.48	*$ 71,600	$108,000	1.98
Ayr.	30,000	5.69	51	9.64	* 18,675	62,300	2.06
Birkenhead.	113,000	13.55	57	6.60		125,700	
Blackpool.	50,000	11.13	62	6.39	* 11,245	112,400	3.26
Blackburn.	188,000	12.54	61	5.64	† 20,305	116,600	2.72
Bolton.	171,100	25.13	55	8.17	* 74,545	93,800	2.30
Bradford.	279,767	42.52	69	7.64		87,000	
Brighton.	123,500	6.50	72	5.89	* 20,675	157,700	2.00
Burnley.	154,000	7.15	60	10.49	* 12,875	74,400	2 82
Cardiff.	172,598	11.54	65	4.62		260,500	
Dover.	41,794	3.01	76	8.00		68,500	
Dundee.	163,000	12.50	67	5.35	* 4,265	102,600	1.86
East Ham.	104,000	6.70	71	5.62	* 8,940	95,500	1.22
Farnworth.	50,000	4.25	75	4.07	† 9,655	50,200	2.02
Glasgow.	1,000,000	65.34	46	16.54	* 1,214,160	163,000	1.76
Halifax.	106,000	30.80	75	4.93	† 1,060	50,800	2.00
Huddersfield.	105,000	28.00	62	5.24	† 17,975	71,600	2.58
Hull.	248,000	10.45	53	12.71	* 125,865	163,000	2.00
Leeds.	437,000	41.75	56	11.27	* 380,520	124,500	2.20
Leicester.	211,579	11.86	80	5.15		84,500	
Liverpool.	760,000	55.00	66	9.47	* 377,485	166,600	2.22
London.	4,536,541	39.70	90	3.17	† 11,250	189,500	1.86
Manchester.	543,872	75.00	61	10.32	* 347,755	80,100	2.20
Newcastle-on-Tyne.	219,200	19.68	58	7.15	* 60,505	229,200	2.16
Northampton.	87,021	5.41	73	7.25		39,100	
Nottingham.	239,800	15.57	53	10.17	* 154,260	171,600	2.22
Oldham.	138,786	17.20	82	2.30		130,500	
Plymouth.	112,000	7.04	83	3.61		94,200	
Portsmouth.	192,200	14.50	44	7.58	* 65,325	213,800	2.42
Rochdale.	83,100	3.96	75	2.11	† 7,535	80,900	2.80
Salford.	300,000		71	9.43	* 65,040		2.46
Sheffield.	411,000	33.00	64	8.42	* 140,840	134,000	1.80
Southampton.	107,800	9.72	61	10.86	* 54,460	93,800	2.56
Southport.	49,000	8.42	69	4.41	† 6,115	69,400	2.20
Sunderland.	158,800	9.98	58	9.64	* 52,310	129,500	2.02
Yarmouth.	51,800	3.59	69	4.71	* 2,670	59,000	2.20

"6. The institution of a ten hours day (or sixty hours per week) for all tramway employees.

"7. The recognition of the principle of 'one day's rest in seven.'

"8. Increased wages for employees.

"9. Provision of uniforms for drivers and conductors.

"It should be noted that when the London County Council bought out the Tramways Company the price settled by the arbitrator was only $509,000, although the company had claimed $3,020,000.

"The wages paid in British cities are smaller than in American cities, but better under municipal ownership than under private ownership. In London the pay of the motormen and conductors ranges from $1.18 to $1.56 per day, the maximum being reached after twelve months' service. Each man is allowed in addition a uniform coat, an overcoat and two caps per year. In Huddersfield conductors are paid 11 cents per hour and motormen 14 cents an hour. In Manchester the hours have been reduced from 70 to 54 per week.

"The following table compiled from the British Municipal Year Book will give interesting statistics of municipal operation of street railways in thirty-six cities and towns. The table shows the population of each city, the miles of streets covered by the street railway systems, the percentage of the gross receipts that is eaten up by operating expenses, the percentage of net receipts (gross receipts minus operating expenses) to capital invested, the net surplus or deficit after paying interest and rental charges, the capital investment per mile of double track and the average fare paid by the passengers. These statistics are for the year ending June 30, 1903:

"It should be noticed that the average fare paid is less than three cents in every case but one, while in London, Glasgow, Sheffield and a few other cities the average is less than two cents. Out of 28 cities for which the figures are given, 7 show a deficit after paying operating expenses and interest and rental charges, while Glasgow shows more than $1,200,000 surplus. Out of the surplus, appropriations are made for depreciation and for contributions to the municipal treasury. The figures showing the percentage of net receipts upon the capital invested simply mean that after paying operating expenses, the city has enough left to bring such a percentage return on the cost of construction. Out of this must be taken the interest and rental charges and the amount set off for depreciation.

"In British cities the fares are arranged according to distance traveled. In Glasgow the average charge per mile is .94 cents under municipal ownership. Under private ownership it used to be 1.78 cents. The following shows the distance that can be traveled for each fare: For 1 cent, 1.58 miles; for 2 cents, 2.30 miles; for 3 cents, 3.48 miles; for 4 cents, 4.64 miles; for 5 cents, 5.80 miles; for 6 cents, 6.89 miles; for 7 cents, 8.15 miles; for 8 cents, 9.09 miles."

International Association of Fire Engineers

THE thirty-third annual convention of the International Association of Fire Engineers will be held at Duluth, Minn., August 16th to 19th, inclusive. Secretary James McFall has furnished THE MUNICIPAL JOURNAL with a copy of the program as arranged by a recent meeting of the Board of Directors at Dayton, O., as follows:

TOPICS AND ASSIGNMENTS

Topic No. 1—"The Best Fire Protection for Excursion and all Passenger Steamboats." Rufus R. Fancher, New Haven, Conn.

Topic No. 2—"Is a Combination Nozzle Where the Pipemen can Throw Spray at Will (Like a Water Curtain in a Theater), in Addition to a Solid Stream, Sufficient Protection from the Heat and Smoke to the Men Handling the Pipe to Compensate Them for the Loss a Solid Stream Sustains?" Geo. W. Miller, Reading, Pa.

Topic No. 3—"Advantages of Fire Alarm Equipment in Fire Departments." Frank C. Stover, Chicago, Ill.

Topic No. 4—"The Best Means to Bring About and Create a Greater Interest by the Public at Large in the Annual Meetings of the International Association of Fire Engineers." Chas. S. Allen, Trenton, N. J.

Topic No. 5—"How to Organize and Maintain a Volunteer Fire Department." Frank Manley, Dalton, Ga.

Topic No. 6—"Value of Searchlights for Fire Departments." C. E. Swingley, St. Louis, Mo.

Topic No. 7—"Are Chiefs of Foreign Fire Departments Benefited by Their Attendance at the Meetings of our Association?" Federico G. Morales, Havana, Cuba.

Topic No. 8—"Suggestions Regarding Conflagrations, Their Cause, and Best Plan for Prevention." Geo. M. Kellog, Sioux City, Ia.

Topic No. 9—"The Advantages of Automobiles over Horses for Fire Service." C. E. Swingley, St. Louis, Mo.

Topic No. 10—"Fire Drill and School of Instruction, with Plan of Training Tower." John Kendall, Detroit, Mich.

Topic No. 11—"Standard Threads." J. R. Canterbury, Minneapolis, Minn., F. W. Sheppard, editor "Fire and Water," New York.

Open for Discussion

"Which is the Most Practical for Service on a Combination Wagon or Chemical Engine, a Reel or Basket?"

"Can a Covering be made that will Protect Chemical Hose from Being Cut by Broken Glass?"

The special committee appointed at Chattanooga, consisting of M. E. Higgins, D. E. Benedict, and T. E. Doane, will report on the advisability of establishing an insurance department among the members.

The secretary was instructed to say to the members that the regular topics and special subjects selected are in no wise to be considered the only questions that can be discussed on the floor of the convention; on the contrary, the officers would be pleased for all members desiring information upon any subject whatever, to present the same, and the president promises them that he will use his best endeavors to have a full and free expression of opinion from the members.

Our association exists that we may give and receive our experience and advice; therefore, it will be your fault if you do not secure the desired information. The opportunity is presented to all.

Hotel Arrangements

The Spaulding Hotel: Has 175 available rooms; 85 rooms with private baths. American plan, $2.50 to $5.00 per day; European plan, $1.00 to $3.50 per day.

Lennox Hotel: Can accommodate 100 people; 60 sleeping rooms; 12 rooms with bath; 20 rooms with running water. American plan, one person, with bath, $3.50 per day; without bath, $3.00 per day; each additional person, $2.00 per day. European plan, with bath, $2.50 per day; without bath, $2.00 per day; each additional person, $1.00 per day.

St. Louis Hotel: Can accommodate 100 persons; 25 rooms with bath. American plan, $2.00 per day, two in a room; one in a room, $2.50 to $3.00 per day.

Hotel McKay: American plan, two in a room, with bath, $1.50 per day; one in room, with bath, $2.50 per day; without bath, $2.00.

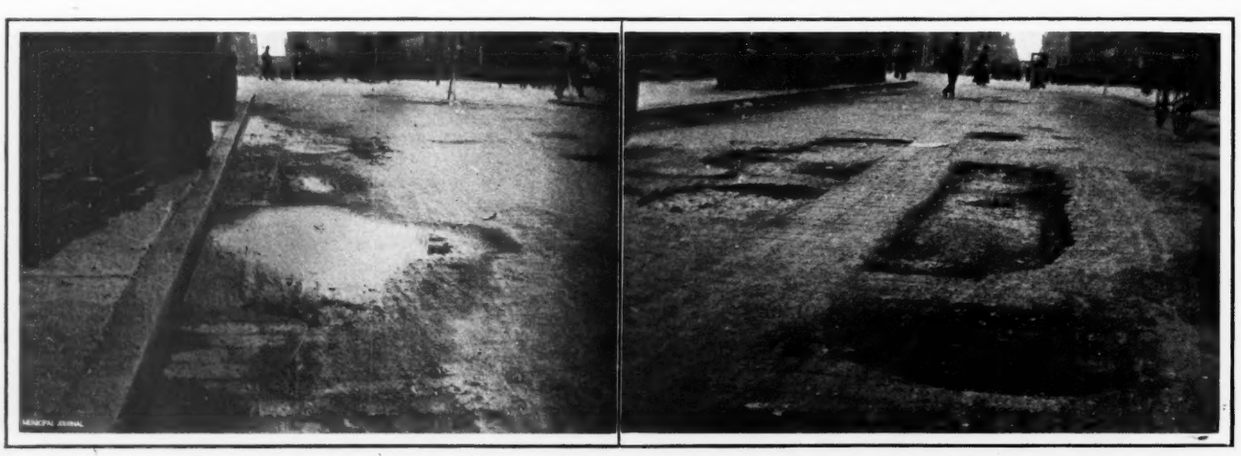
Due notice will be given later regarding railroad rates and other information.

Some of New York's Poor Asphalt

Water is the worst enemy to every well laid asphalt pavement, whether sheet or block, and when asphalt pavement is poorly constructed it destroys it with greater rapidity. The accompanying illustrations show some of the large holes which have worn in the asphalt block pavement laid on Twenty-seventh street in New York City, in 1901. This is not the first time the pavement has had to be repaired, and probably before its ten-year guarantee has expired the street will have been entirely re-surfaced because of the rapid disintegration of the original paving from the effects of water.

The pavement represented in the illustrations was laid with an asphalt block, measuring 5 x 3 x 12 inches, at a cost of $2.72 per square yard. Under the contract 20 per cent. was to be retained of which, at the end of the sixth year, 4 per cent. should be returned to the contractor, and each succeeding year 4 per cent., until the amount retained had been fully returned to the contractor.

The specifications required that the composition of the asphalt block should be as follows: Asphaltic cement six to eleven parts; crushed trap rock eighty-nine to seventy-four; pulverized carbonate of lime five to fifteen; concrete proportions 1-3-6, concrete five inches thick, of which the last half-inch was a float top, composed of stone and cement. As to repairs, the contractor is obliged to immediately repair and make good to the satisfaction of the Com-



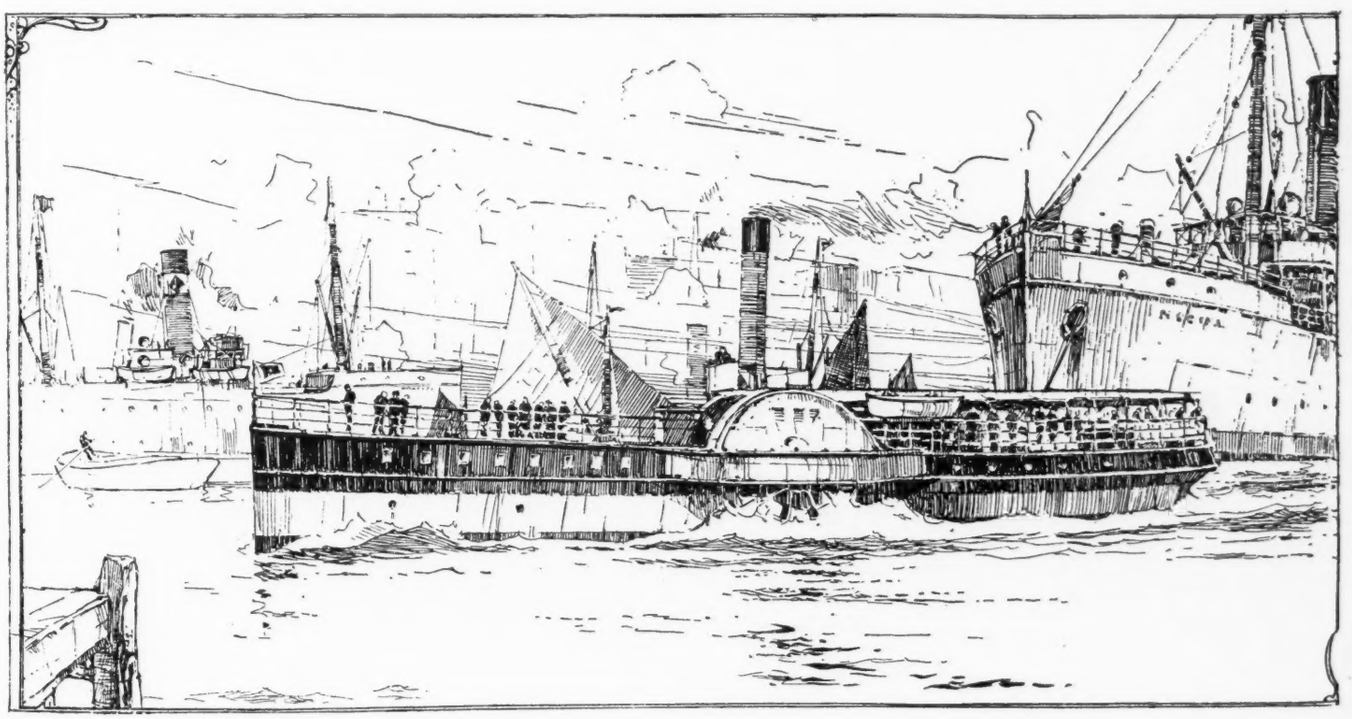
ROTTEN ASPHALT BLOCK ON TWENTY-SEVENTH STREET, NEW YORK CITY

missioner, any breaks, holes or settlements, or any depressions in the pavement, which would occur at any time during the period of ten years.

Judging from the general appearance of the asphalt streets in New York City, which are certainly in a dilapidated condition, and taking into consideration the long term guarantee, it is quite evident that by the time the guarantee has expired, the contractor will have realized an exceedingly small profit, if he is required by the city authorities to live up to his guarantee.

Municipal Steamboats

BRITISH cities lead the world in the ownership and operation of various kinds of public utilities. In the United States municipal undertakings have been usually limited to water and light. In British cities, however, they undertake to own and operate nearly everything. The London County Council is renewing the equipment of its steamboat service, which has been run under its auspices for many years.



A SKETCH OF ONE OF THE LONDON COUNTY COUNCIL'S NEW STEAMBOATS

The new service will include thirty boats, which will ply over a route which will take two and a half hours to traverse. Part of the boats will be used as express boats. It is expected that from one extreme to the other, boats will be available from five in the morning until a quarter past seven in the evening, and moonlight trips are contemplated for summer. The capital expenditure for this undertaking will amount to $1,500,000. To make this service pay it will require an annual income of about $500,000. It is confidently expected the venture will be made to pay, although the fares have been prepared on a schedule that is even lower than that which is in force on the tramways, including special facilities for workmen under which they will charge a penny a single trip and two-pence a return trip between any points between Hammersmith and London Bridge, and London Bridge and Greenwich.

The boats will be expected to attain a speed of about twelve miles an hour, regular run; each will accommodate between 400 and 500 passengers, and will seat from 180 to 200. It is expected that all boats will be running on schedule time by the first of June.

Municipal Railway for San Francisco*

BY a unanimous vote the Supervisors of San Francisco have declared themselves in favor of the city making the Geary Street railroad an up-to-date underground electric line, and of operating the same by the people and for the people.

Since the expiration of its franchise, November 5, 1903, the Geary-street company has been operating its cars by sufferance, and paid five per cent. of the gross receipts to the city. For the year ending November 30, 1905, the company reported gross receipts of $162,616, and paid into the city treasury $8,130.80. The number of cars operated by the company gives a total of about 650,000 car miles run during the year, which makes the receipts 25 cents per car mile. The total number of passengers was about 3,237,000, or about five per car mile.

Formerly, the company exchanged transfers with the United Railroads, paying $1,000 per month for that privilege, and the use of the track of the latter on Fulton street, from Fifth to Tenth avenue, at the Chutes. After the expiration of the franchise, it was announced that the companies could not agree as to the compensation for these privileges, and they ceased to exchange transfers. The prevailing opinion at the time was that this was intended to influence public opinion, so that the inconvenience would

* Edward P. E. Troy, in the San Francisco *Star*.

force the granting of a franchise. However, it had the contrary effect, and made many new adherents to the cause of municipal ownership.

For years the Geary-street company has paid $33,500 interest on its bonded debt, and six per cent. on its $1,000,000 capital. As but $370,000 of the latter was paid up, it was paying over sixteen per cent. During the twenty-five years the company had been in operation, it paid sufficient in dividends to repay to its stockholders, the $671,000 of bonded debt, and the $370,000 paid-up capital, and five per cent. per annum on the same from the time of its investment, besides paying the annual interest on the bonded debt. The company has endeavored to create the impression that it is losing money under the present arrangement. The company now carries five passengers per car mile, while formerly it carried 5.10. The difference represents a loss of 65,000 passengers on the present car mileage, or $3,250. When transfers were given, the distance run was longer, more cars were operated and the gross receipts were $195,000. The expense of operation was also greater. The fare passengers carried last year averaged 426,000 per mile of single track. The United States Census Bulletin reports that during 1902, the United Railroads carried 408,899 passengers per mile of single track, the Presidio and Ferries (Union-street line) 362,290, and the California-street cable 776,267. From these figures it will be seen that the Geary-street road, "beginning nowhere and ending nowhere," is doing as well as any street car system in the city.

At the time of the expiration of the franchise, the president of the Geary-street company acknowledged to the Public Utility Committee of the Board of Supervisors that the roadbed and track in the street had become the property of the city. All that the company now possesses is its old cars and machinery, and an interest in two pieces of real estate, all of which would not sell for $100,000. As the cost of operation of the Geary-street road does not exceed fifty per cent. of its receipts, its profit—$81,308—is over eighty per cent. on its present investment.

Former City Engineer C. E. Grunsky, in his report, stated that under municipal operation, with the city paying 31¼ cents per hour to conductors and motormen (the Geary-street company pays from 25 to 27½ cents), the cost of running forty cars twenty hours per day would be 13.7 cents per car mile. A change from the present ramshackle system, with its unpainted cars, to a modern conduit electric system with up-to-date cars, would cause an increase in the travel of at least twenty-five per cent. Figuring on the present car mileage only, this would give the city a profit in operation of about $114,000 per annum. The Capital Traction Company has about thirty-five miles of conduit road in the city of Washington. Its report for the year 1904 shows its operating expense to be forty-one per cent. of the gross receipts. At this rate, the above profit would be increased to $120,000 per annum.

Should the city for the first year purchase its power delivered along the road at 500 volts, in the same manner as the United Railroads delivers its power to the cars, the system can be installed and put in operation for $320,000. This will include the conversion of the present roadbed to the conduit system, and its equipment with the necessary electrical appliances, the purchase of the cars, and a site for a carhouse, and the construction of the same.

This is a good business investment that the city can well afford to make. As the United Railroads refuses to reconstruct its Sutter-street system to a conduit road, saying that it can not be done, the city should do this work, in order that its feasibility can be proven. Each year extensions can be made out of the profits, and soon the municipal street railway will afford accommodation to the entire city.

Vital Statistics of Germany*

THE Imperial Bureau of German Statistics is accustomed to make and publish periodically some very interesting studies based on the vital statistics of the Empire. These studies relate primarily to the marriage, birth, and death rates, as related to the increase, change of domicile, and other movements of the population, and, taken together, shed a very interesting side light upon the steady, symmetrical growth of the German people. The latest studies of this kind have been based upon the vital statistics of 1903, and from results recently published the following facts are derived:

The census of Germany is taken at the beginning of December every fifth year. The last one, taken December 1, 1900, showed a total population of 56,367,178, an increase of 4,087,277, or 7.8 per cent., during the five years since December 1, 1895. It may therefore be assumed that the total population of the Empire during 1903, the year under observation, was about 59,000,000 souls. Among these people there were solemnized during the year 463,150 marriages, which was equal to 7.91 for each 1,000 of the population. The months most prolific in weddings were in the following order: October, May, November, and April. Of the men who married, about 44 per cent. were between the ages of 25 and 30 years; the brides, in 56 per cent. of all marriages, were under 25 years of age. In 95,577 cases, or 20.6 per cent. of the whole number, the bride was older than the bridegroom. Ninety per cent. of the men and 91 per cent. of the women had not been previously married. Of the whole number of marriages, 276,468 were of the evangelical faith, 140,965 were Catholics, and 3,831 of the Jewish religion.

The total number of births was 2,046,206, of which 1,983,078, or 96.91 per cent., were living, and 63,128, or 3.09 per cent., stillborn. Born in wedlock were 1,875,672 children; out of wedlock 170,534, or 8.33 per cent. of the whole number. Twins were numerous—26,265 pairs, or 13 out of each 1,000 births; of triplets there were 270 and quadruplets 2 cases, both of the latter in Bavaria. Of the whole 52,804 children of plural births 26,816 were males and 25,388 females. Illegitimate births were most numerous in February, March, April, and May; least numerous in August and October. Stillbirths were most numerous in August, October, and June.

Against this stalwart birth record there were 1,234,033 deaths, a net gain by natural causes of 747,045 souls during the year. The most fatal months were, in order, February, January, August, September, and March; the least deadly, November, December, and June. The high death rate of

* From United States Consul-General Mason, Berlin, Germany.

February was due, as usual, to tuberculosis and other maladies of the respiratory organs, which are the scourge of this humid, sunless winter climate, and to various complications resulting from influenza. The high relative mortality of August and September, 1903, is attributed to the fact that the prevalent weather was exceptionally warm and wet, conditions under which the death rate from intestinal disease is uniformly increased in Germany. Especially fatal was that period to nursing children, the number of deaths of infants during July, August, and September, 1903, having been about 10,000, or more than those during the whole year 1902. With all the progress of German medicine and surgery; with all the amelioration that improved midwifery and skilful nutrition have provided, the infant death record is here, as elsewhere, a pathetic and lamentable one. Of the whole 1,234,033 deaths in Germany during 1903 no less than 404,529, or 34.5 per cent., were of children under 1 year of age. Leaving out of account the stillbirths, 20.4 per cent, or one in five of the children born alive, died before they had reached the age of 12 months. Of the whole number of these victims, 351,086, or 19.3 of every 100 born, were legitimate, and 53,437, or 32.7 per cent., were those born out of wedlock. The least fatal decade of human life in Germany is that between the tenth and twentieth years. From the latter age onward the death rate increases quite uniformly with advancing age.

In respect to self murder Germany continues to present a sinister record. There were 11,393 suicides in 1900, 11,386 in 1901, and 12,336, namely, 9,763 males and 2,570 females, in 1902. This was 21 suicides for every 100,000 of the population of Germany, a rate which can only be explained by what certain psychologists have declared to be a racial tendency, accentuated in the cases of many individuals by poverty, resentment of military discipline, and fear of remorse growing out of failure to pass difficult examinations in school and college. It is noticeable, however, that the suicide death rate is slowly but steadily declining. In 1877 the proportion was 30 suicides to each 100,000 inhabitants, in 1879, 1881, and 1882 it rose to 31, since when it has gradually declined with the generally improved social and material condition of the working classes until the annual tribute of self murder is from 20 to 25 per 100,000.

Death by accident and murder costs the Fatherland annually from 35 to 37 human lives for every 100,000 of the people. This includes, of course, the loss of life by rail, and here there is a showing which more than compensates for the gloomy record of suicide. The exact statistics of railway casualties do not form a part of the published report, but they have been specially prepared and furnished to this consulate by the Imperial health officer for the five years from 1897 to 1901 inclusive, as follows:

Persons Killed on Railroads in Germany, 1897 to 1901.

Year.	Passengers.	Employees.	Total.
1897	98	722	820
1898	72	825	897
1899	79	842	921
1900	119	860	979
1901	75	788	863
Total	443	4,037	4,480

Compare these figures with the 411 people killed and 3,747 injured by railways in the United States during the period of three months from July 1 to September 30, 1904, and it will be seen that in one respect, at least, human life is better protected here than in America.

In respect to malignant diseases, one of the darkest spots in the records of recent years is the steadily growing death rate from cancer. Not less than 35 persons per week—a minimum average of 5 per day—die of cancerous disease within the municipal limits of Berlin.

Leeds Street-Car System*

THE financial year of the Leeds corporation, which closed a few days ago, shows that the receipts of the street-car department for the last twelve months have been $1,475,000, about $85,000 more than in the previous year. Such a substantial increase in the income appears to prove that the policy of extending the street-car system to every part of the city was a wise one. The mileage is practically the same now as it was two years ago, but the past year's increase in receipts is nearly $10,000 more than that in the year 1903, when the increase reached $76,105. The past year's figures are interesting as showing not only that there will be a very substantial profit—in spite of the repression of trade that has been generally felt in the city—but also that the cheapening of fares in many directions has been accomplished without financial loss.

Of a total number of 64,223,666 passengers carried, 4,781,417 paid 1 cent fare; 50,778,052 paid 2 cents; 1,424,136 paid 3 cents; 6,150,880 paid 4 cents, and 1,089,181 paid 6 cents. During the preceding twelve months the total was 60,739,234 passengers, or 3,484,432 less.

The average receipts per mile amount to just over 20 cents—a fraction less than in the preceding year—but with an increase in the gross takings of about $85,000. It is hoped that when the other side of the account, namely, the expenditure, is made out, the balance of profit will be nearly, if not quite, as great as it was a year ago, when, it will be remembered, the handsome sum of $260,000 was handed over to the city treasurer in relief of the taxes, after all necessary allowances for maintenance, depreciation, interest, and sinking-fund charges had been made. The work of the system for the past three years is shown in the following table:

Statistics of Leeds Street Railway Management, 1903 to 1905.

Item.	1904-5.	1903-4.	1902-3.
Receipts	$1,475,000	$1,388,265	$1,312,165
Mileage	7,000,000	6,091,437	5,773,651
Passengers carried	64,223,666	60,739,234	57,239,779
Receipts per mile.....cents	20	21¾	21¾

Leeds is a city of about 450,000 population. It is surrounded by a number of suburban places, in many of which there are street-car systems owned by private companies. These companies have an arrangement with the Leeds corporation by which they run their cars over the corporation's tracks to the center of the city. In this way the suburban systems act as feeders to the city system, and the convenience of out-of-town passengers is greatly increased.

Leeds continues to claim that it has one of the best managed and most profitable street-car systems owned and operated by the corporation of any city in England.

* From United States Consul Hamm, Hull, England.

LITERATURE ON MUNICIPAL TOPICS*

Reviews of Some Important Books—What the Magazines and Reviews Have to Say about Civic Affairs—Municipal Reports Received

Books

The Modern Asphalt Pavement, by Clifford Richardson. Octavo, 580 pp., 32 figures; cloth binding; published by John Wiley & Sons, New York.

This is the most exhaustive technical work on the subject which has been published. It would be of more value if its argument and conclusion were not based on the commercial interest of the writer, or rather of his employer, the "Asphalt Trust."

He speaks of the book as the result of work in the "New York Testing Laboratory," carrying out the idea the Trust has tried to convey since its organization in 1899, that this is an independent laboratory, freely taking business from the public, while in fact it is merely one of the constituents of the Asphalt Trust, and is engaged on the work of that organization almost exclusively, and reports on public work are such as are to the interest of the Trust.

So the book shines throughout with Trust policies and conclusions according to its interests; the chief one being to bolster up the Trinidad Lake asphalt, the use of which, on account of its inferiority, is now fast waning, and is now shut out of competition in New York, Washington and other cities.

The Trust has a large investment in Trinidad; is under contract to use a large amount of Trinidad Lake asphalt, which is the cheapest, as it is about the poorest asphalt produced, and the Trust employees—including Mr. Richardson—must do all in their power to "bolster up" the losing cause, or their employers will lose the concession and investment in Trinidad. Hence, as far as the Trust and its employees can influence matters, municipalities must use this—now well proved to be inferior—material, and the chief aim of this book appears to be to this end, but covertly so, to the degree of ingenuity.

The intelligent reader will be surprised to hear that the success of an asphalt depends on the vastness of the deposit, and that "a deposit to be of any great value should afford a supply of at least 50,000 tons annually without difficulty," and the effort is made to show that deposits of less vastness are unreliable.

The fact is, that an annual supply of 50,000 tons of pure asphalt or bitumen would lay 5,000,000 square yards of standard asphalt pavement per year, or nearly double the entire annual area or asphalt pavements laid in the United States of all grades of asphalt. "Trinidad Pitch Lake" is the only deposit which could produce this vast amount of asphalt. Trinidad Pitch Lake is controlled by the Asphalt Trust; hence the extravagant statement quoted above.

It is a fact well established scientifically as well as practically, that Trinidad asphalt, because of its very nature containing soluble salts and other impurities, will rot on exposure to water or moisture. Mr. Richardson weaves an ingenious argument in an effort to make the public believe that this is of no consequence and not a real objection to the use of Trinidad asphalt.

It goes without saying that a denser mixture of sand and Trinidad asphalt, such as Mr. Richardson and all other experts recommend, is less affected by moisture than a more porous combination. It also goes without saying that an asphalt which in itself is not affected by water, may be made into a paving mixture which will deteriorate from any of the following, among many other possible causes: (a) Overheating, or otherwise improperly handling the material. (b) Lack of compression. (c) By mechanical effect of water especially on porous mixtures.

The fact, however, remains—Mr. Richardson to the contrary notwithstanding—that an asphalt which, in its refined state, will rot on immersion in water, should never be used. Trinidad asphalt, whether "land" or "lake," will not stand either on the street or in the laboratory— the essential test of which Mr. Richardson makes light—and should for this reason, be rejected by every city desiring the best asphalt pavement, as it has been rejected for this reason in New York, Washington and a number of other cities.

Mr. Richardson points to pavements laid with a denser mixture of sand, filler and Trinidad asphalt, which have proved better than others. This is begging the question, and the fact remains that the very pavements laid in this way within the past three to five years, to which he refers, do, on careful examination, show the rotting effect of water on the Trinidad asphalt in the gutters and, on the under side, from moisture in the foundation. This rotting is well known to be the cause of surface "scale" of asphalt pavements, regarding which Mr. Richardson says "no satisfactory explanation of this phenomenon has been advanced and we must content ourselves with its condition."

To the practical mind, which appreciates that water entering the pores of any pavement is a serious damage to the pavement, it would seem that no combination of any asphalt and sand which cannot be made sufficiently dense to fill all voids in the mineral aggregate with bitumen without making the pavement too soft, can be free from the damaging effect of moisture.

This inherent weakness of asphalt and sand mixture is the basis of the theory of the bitulithic pavement—reducing the voids in the mineral aggregate by the use of particles of crushed stone from about one inch to an impalpable powder, in certain proportions as to size, to give the mineral aggregate an inherent stability and reduce the voids to such a degree that they can be absolutely filled with bitumen, the resulting compressed pavement having the density of solid stone.

* Any book or periodical reviewed or mentioned in THE MUNICIPAL JOURNAL, or elsewhere, will be sent to any address on receipt of price.

Mr. Richardson interestingly discusses and describes the various asphalt deposits and processes of refining; but here, too, commercialism enters the discussion, and each asphalt mentioned is claimed to be unreliable with the exception of Trinidad Lake asphalt, which has, in reality, proved to be about the poorest of them all. Each kind of asphalt, except Trinidad Lake is claimed to be inferior in some technical point; is insufficient in quantity to pave the whole United States; or the supply is now exhausted. Twelve pages are devoted to the old argument of "Trinidad Lake versus Trinidad Land asphalt," and Mr. Richardson reaches the conclusion that the "land" asphalt is not satisfactory; but the fact remains that "Land" asphalt pavements are in existence that compare favorably with "Lake" asphalt pavements laid by the Trust and in use under similar conditions for the same time. Thus, in a very practical way, disproving the technical argument in favor of the "Lake," the point is that all Trinidad asphalts, on account of their rotting on exposure to moisture, are inferior to other asphalts which Mr. Richardson would have the public condemn. Mr. Richardson is justly entitled to great credit for improvement in the art of asphalt paving, but it is unfortunate that his commercial interests require his making a labored argument in this otherwise valuable publication, in favor of a discredited material—Trinidad Lake Asphalt.

The book also devotes considerable space to an interesting description of an asphalt paving plant. Herein, also, the Trust's interest predominates; tht machinery described in each case being that of Trust shops, the Iroquois Iron Works, which, like the New York Testing Laboratory, are run with a view to making the public believe they are independent while in fact they are not.

As an exponent of the interests of the Asphalt Trust, to those who do not appreciate the commercial interests back of it, the book is valuable to the Trust.

♣

John Van Buren, Politican, is an anonymous story recently published by Harper & Bros., New York, 290 pp., 12mo. The book is interesting solely for the reason that it tells about the inside workings of Tammany and of the New York State Legislature. To the professional politician it would probably contain no new information, but to the lay reader it would give many pointers. The plot of the story covers the period of Mr. Croker's greatest success as a leader, and while it does not call him by his real name, it is an easy matter to recognize the "Boss of New York," and several other leading characters mentioned. According to this account Tammany is not nearly as black as it is painted, and the Republican organization is represented as being quite as deep in the mire as Tammany or the Democratic organization is in the mud. The price of the book is $1.50.

♣

Articles in American Periodicals

British Refuse Destructors (illustrated), is continued from the *Engineering News,* April 13, New York, in the issue of April 20; also in the same number there is an article on *The New British Regulations for the Use of Heavy Motor Vehicles.*

Hospital Sanitation, Part 1 (illustrated), by William Paul Gerhard, *The American Architect and Building News,* April 22, Times Building, New York.

A Reinforced Concrete Filtration Plant at Marietta, Ohio, (illustrated), *The Engineering News,* April 22, New York.

Municipal Arc Lighting Plant in Columbus, Ohio, (illustrated), by C. Wiler, *Electrical World and Engineer,* April 22, New York.

In the *Ohio Sanitary Bulletin,* January-March, Columbus, O., among others are the following: *Sewage Disposal,* by George A. Johnson, Engineer in Charge, Sewage Testing Station, Columbus, O.; *Filtration of Public Water Supplies,* by R. Winthrop Pratt, Engineer, Ohio State Board of Health; *The Disposal of Garbage and Refuse,* by W. F. Morse, Sanitary Engineer, New York City; *The Conflict Among Legislative Bodies a Hindrance to Sanitation,* by Dr. Mark Millikin, Health Officer, Hamilton, O.; *Sanitary Organization in 1950,* by J. W. Clemmer, M. D., Member Board of Health, Columbus, O.

New Dreams for Cities (illustrated), by Charles Mulford Robinson, *The Architectural Record,* May, New York.

British Refuse Destructors, concluded from April 20, *Engineering News,* April 27, New York.

Hospital Sanitation, Part 2 (illustrated), William Paul Gerhard, *The American Architect,* April 29, New York.

Chicago's Vote for Municipal Ownership; Three Years in Harrisburg (illustrated), by J. Horace McFarland; *The Grouping of Public Buildings in Cleveland* (illustrated), by Edwin Childs Baxter; *Farming Vacant City Lots* (illustrated), by Allen Sutherland, are, among others, in *The American Monthly Illustrated Review of Reviews,* May, New York.

The Arena, May, Trenton, N. J., contains, among others, *Forty Years in the Wilderness; or, Masters and Rulers of "The Freemen" of Pennsylvania* (4. Philadelphia and the Freeman's Ballot), (illustrated), by Rudolph Blankenburg; *Practical Results Which Have Attended the Introduction of Referendum in Switzerland,* by Professor Charles Borgeau, of the University of Geneva; and *The Building of the City Beautiful,* by Joaquin Miller.

The Iowa Engineer, March, published by the Iowa State College, Ames, Ia., contains, among others, the following: *The Concrete Block Industry* (with discussion), by O. U. Miracle, Minneapolis; *Cost of Making and Prices Charged for Building Blocks, Sidewalks, Etc.,* by L. L. Bingham, Estherville, Ia.; *Reinforced Concrete Culverts for Highways,* by T. H. McDonald, Ames, Ia.; *Curing of Cement Blocks* (with discussion), by James Wimmer, Perry, Ia.; *Mixing of Cement,* by R. E. Coutts, Grinnell, Ia.

The New Outfall Sewer of Los Angeles (illustrated), *The Enginering Record,* May 13, New York.

Underground Electric Conduit System in New Orleans, (illustrated), *Electrical World and Engineer,* May 13, New York.

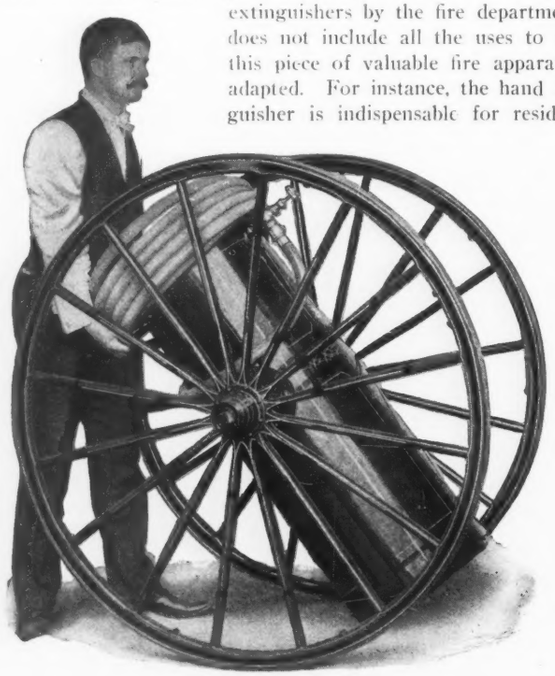
The Telephone System of To-Day, by C. J. H. Woodbury, an abstract of a paper read before the Brooklyn Institute of Arts and Sciences, Polytechnic Institute, Brooklyn, New York, *Electrical Review,* May 13, New York.

Chemical Fire Extinguishers

THE usefulness of the chemical fire extinguisher has been demonstrated most satisfactorily by the leading fire departments of the country. This is true of the various sizes, including the patrol and the large chemical fire engine. The following table compiled from recent reports gives the percentage of fires which were extinguished in one year by means of chemical apparatus, without the assistance of steam fire engines and hose:

	Per cent.		Per cent.
Binghamton, N. Y.	50	Elmira, N. Y.	60
Birmingham, Ala.	75	Omaha, Neb.	50
Boise City, Idaho	75	Oswego, N. Y.	40
Boston, Mass.	50	Paterson, N. J.	70
Brockton, Mass.	75	Peoria, Ill.	40
Buffalo, N. Y.	45	Piqua, Ohio	60
Burlington, Vt.	75	Portland, Ore.	90
Cambridge, Mass.	large	Quincy, Ill.	75
Canton, Ohio	40	Rochester, N. Y.	50
Fort Worth, Texas	40	San Antonio, Tex.	50
Halifax, N. S.	70	San Francisco	50
Haverhill, Mass.	75	Seattle, Wash.	60
Honolulu, Hawaii	40	Manchester, N. H.	40
Indianapolis, Ind.	60	Memphis, Tenn.	75
Jersey City, N. J.	80	Milwaukee, Wis.	40
Joliet, Ill.	50	Minneapolis, Minn.	60
Kalamazoo, Mich.	50	Muncie, Ind.	65
Lawrence, Mass.	50	Nashua, N. H.	70
Lincoln, Neb.	55	New Orleans, La.	large
Los Angeles, Cal.	60	Newton, Mass.	50
Lowell, Mass.	67	Chattanooga, Tenn.	70
Lynn, Mass.	75	Chicago, Ill.	large
Colorado Springs	80	Sioux City, Iowa	55
Columbus, Ohio	50	Spokane, Wash.	50
Council Bluffs, Iowa	75	Springfield, Ohio	50
Dallas, Tex.	50	St. Louis, Mo.	large
Dayton, Ohio	50	Stockton, Cal.	72
Detroit, Mich.	50	Syracuse, N. Y.	30
Denver, Colo.	60	Terre Haute, Ind.	70
Des Moines, Iowa	65	Topeka, Kan.	65
Duluth, Minn.	60	Waltham, Mass.	65
Elgin, Ill.	50	Winnipeg, Man.	70

While the above facts speak volumes for the use of chemical extinguishers by the fire department, it does not include all the uses to which this piece of valuable fire apparatus is adapted. For instance, the hand extinguisher is indispensable for residences,



"CHAMPION" CHEMICAL FIRE ENGINE NO. 7

mills and factories, barns and stables, steam, naphtha or sailing yachts. The people outside of fire departments do not begin to appreciate the importance of having apparatus of this sort always on hand in a convenient location for immediate use in case of fire. "An ounce of prevention is worth a pound of cure" may be mossgrown and trite, nevertheless that person is a "wise guy" who provides for the emergency in advance.

THE "PATROL" EXTINGUISHER

The Champion two-wheel chemical extinguisher operates on the same principle as the smaller size, but has greater capacity and range. Besides, it is mounted on wheels to facilitate transportation. This is the best style for large buildings, factories and stores. As a matter of fact it is a fire engine inside your premises ready for instant use at the time when a fire is easily extinguished. For full particulars and prices, send to the American-La France Fire Engine Company, Elmira, N. Y.

That there is an urgent need for the more general use of the chemical fire extinguishers of all sizes will be readily apprehended by the following excerpt from the address of the president of the National Board of Fire Underwriters. In referring to the fire losses in this country he said:

"The fire losses in the United States are increasing annually and at an alarming rate. For the past six years the aggregate losses have been as follows:

1899	$153,597,830
1900	160,929,805
1901	165,817,810
1902	161,078,040
1903	145,302,155
1904	229,198,050
Total	$1,015,923,690
Average	169,320,615

"The enormous increase in 1904, when the loss was the largest in the history of fire insurance, exceeding even 1872 and 1873, the years of the Chicago and Boston fires, has alarmed the underwriters, and presumably they are preparing to make another general advance in rates. Among the heavy losses in 1904 were: Fifty millions in Baltimore, three millions at Rochester, two millions at Yazoo City, nearly two millions at Sioux City, a million and a half at Shelby, Ohio, and a million at Peoria, Ill.

"Is an advance in rates justifiable? If the loss at Baltimore — altogether exceptional—be deducted from the total for 1904, the remainder is $179,198,050. Add this to the total for 1903 and we have $324,500,205; divide this by two and we have an average fire loss for 1903 and 1904—the Baltimore loss deducted—of $162,250,102, which is actually less than the average loss of the three previous years. This refinement of calculation may not meet the

THE "BABCOCK" EXTINGUISHER

approval of the fire underwriters, but their patrons will see the point. Fire losses were exceptionally small in 1903, when the companies made large profits, and they were exceptionally large in 1904, when they made large losses, but for the two years, leaving the Baltimore loss out of account, the fire loss did not quite reach the average. As to that loss, it is to be said that experience compels the companies to anticipate precisely such inroads upon their surplus earnings, and for years they have been making charges to meet it. It is believed that in some city now unknown and at some time that cannot now be foreseen, there will be another fifty million loss; the companies understand it and are preparing for it, just as they prepared for the Baltimore loss. The point, then, that we are trying to make clear is that there is no justification for another advance in rates. It has been the custom for the companies to advance rates whenever they sustain a loss, and in the city of Rochester to-day, though the city is better protected against fire than ever before, the insurance rates are the highest in our history. At the meeting of the underwriters in New York legislation, both national and State, was suggested in the interest of the companies. It seems to us, however, that there is greater need for legislation for the protection of the insured against extortion. Rates are too high already and if there is any competition among companies for business we fail to see evidence of it. Rates are uniform and the question as to whether such uniformity is due to unlawful acts is one into which the Department of Commerce and Labor should make a searching investigation."

"As Good As" Bitulithic

In view of the persistent efforts of contractors opposed to the bitulithic to endeavor to show municipalities that, if permitted to experiment, they can lay pavements "as good as" bitulithic, The Municipal Journal is pleased to give its readers the result of similar experiments which have been tried. In the May number reference was made to some failures in this line of The Barber Asphalt Paving Company in New York City.

In the January issue the defects in a so-called "bituminous macadam" pavement laid in Paris, Ky., less than three months before was described and predicted a failure. A report of our special correspondent, received from Paris under date of April 19, 1905, shows that the predictions were well founded. The report reads as follows:

"In compliance with your request I visited Paris, Ky., and made a careful examination of the pavement on Main street. The total area on this street is about 10,400 square yards. A large portion of the surface was covered with mud, so that it was impossible to make a minute and accurate estimate of the amount that will necessarily have to be taken up; but I think it can be safely stated that fully 50 per cent. of the surface will have to be renewed, and it is possible that within three months three-fourths of it will have gone to pieces.

"The wearing surface on a little over two entire blocks has almost entirely disappeared. The property owners on the street and the citizens generally are up in arms, and are making it very lively for the city council, and especially for the members of the street committee, who awarded the contract.

"The chairman of the committee of streets, Mr. O'Brien, has a letter from the contractor, in which he stated that they expected to send a force there about May 1st, to make whatever repairs were necessary. Before writing this letter, he had visited Paris and endeavored to get the committee to pay him 80 per cent. of the amount withheld, but the council positively declined to do it. The committee told him that they would absolutely decline to pay another cent on this work until it has been relaid or made satisfactory to the council."

In the April issue we referred to indications of failure of a so-called "bituminous or asphalt macadam" pavement laid last fall and then covered with snow. A report from our special correspondent in Elmira, dated April 21, 1905, reads as follows:

"William street from the intersection of Lake and Fifth streets to Market street, was paved with bituminous asphaltic macadam in the fall of 1904 by an Elmira contractor. From about the time it was completed last year up to less than a month ago it was covered with snow and ice, and now, after less than four weeks of service this spring, it has many good-sized holes and any number of spots that are developing into holes as rapidly as can be expected considering the light traffic to which it is subjected. The greater amount of the traffic passing over it is confined to the center of the street, so that is where it shows the effects of traffic. On the sides, however, excepting on the west side, where the gutter grades are poor and hold lots of water, the pavement appears hard and smooth and looks very good.

"In detail the location of the holes and other defects are as follows: From the intersection of Lake and Fifth streets to Church street, four blocks, there are depressions, holding water, that vary in size from one foot square up to eight feet long and two feet wide. Some of these depressions are very close together, while others are spaced from twenty to one hundred feet apart.

"In the block between Lake and Clinton streets there are five holes; and the pavement between the holes is cracked, also soft and spongy.

"Similar conditions exist in the pavement opposite houses numbers 615, 611, 506, 502, 409, 319, 315, 311, 507 and 302.

"Opposite house numbers 611, 523, 511, 410, and 409 there are holes varying in size from one to two feet square.

BITUMINOUS ASPHALTIC MACADAM, "AS GOOD AS" BITULITHIC, ELMIRA, N. Y.—FAILED AFTER FEW MONTHS' USE

"Opposite house number 302 a space eight feet long and one foot wide is soft and spongy and raveling.

"In the block between Church and Market streets, opposite Snyder's wagon shop, there is a space about fifty feet long and from one to four feet wide where the surface stone is crumbling and raveling. It already has four holes."

The following extract from the Elmira *Gazette and Free Press*, March 25, 1905, needs no further comment:

"Interested in the Pavement. Williams Street Residents Get First Spring View of It To-day. Trying Their Heels on It.

"In one spot the surface crumbled under pressure. Workmen have not yet cleaned upper portion. West Clinton streeters also interested.

"Street cleaners began uncovering the William street pavement to-day. All winter it has been under a thick coat of snow and ice.

The removal of the covering attracted much attention, as the property owners were anxious to see how the pavement, against which many of them protest, stands the wear of time and weather.

"One spot in particular attracted much attention. It is about 100 feet from Church street towards Market street. Many persons tried the effect of their heels and toes upon this spot. The surface crumbled under the pressure. The workmen have not yet reached the part of the pavement of which there has been the most complaint. Parts of the cleaned pavement look all right and present a hard, smooth surface to view. But the soft parts which appeared

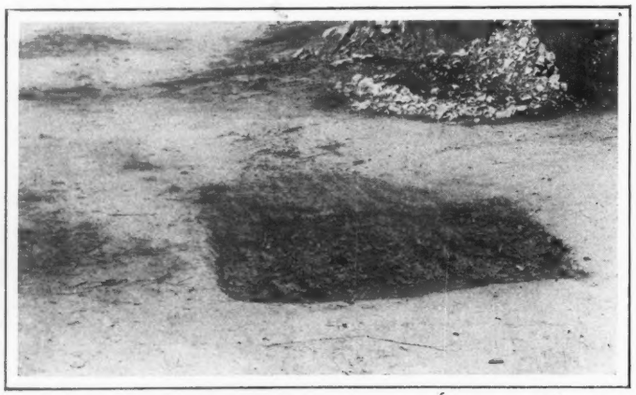
REPAIRS IN WILLETT STREET, ROME, N. Y., "AS GOOD AS" BITULITHIC PAVEMENT, LAID, NOVEMBER, 1904

elsewhere provided the protestants against the pavement with a text for much discourse.

"Residents of Clinton street have also been examining the William street work to-day. They anticipate the same kind on their street, although they are opposed to any pavement."

In the April issue we referred to a failure in St. Mary's, Pa., of a so-called "bituminous or asphaltic macadam" pavement in that city. The following from Mr. Matthew Gerg, a leading carriage manufacturer of St. Mary's and taxpayer on one of the streets referred to, under date of April 19, 1905, is to the point:

"Replying to your inquiry will state that the bituminous asphaltic macadam which was laid in Michael and Brussells streets, in St. Mary's, during the fall of 1901, is extremely unsatisfactory to property owners, city officials and the people who have to use it, for it is full of holes its entire length. There are large holes in the pavement next to the curbing as well as in the center of the street, where, as I stated above, the ruts and hollows are so numerous that it would be a hard matter to locate a single spot that does not show disintegration and raveling.



UNREPAIRED HOLES IN WEST WILLETT STREET, ROME, N. Y., "AS GOOD AS" BITULITHIC, LAID, NOVEMBER, 1904

"The section between Mr. John Kaul's driveway and the terminus of the pavement, about 480 feet long, the top surface is entirely worn off down to the foundation. The pavement in this section has been resurfaced twice already and the rest of the street has been extensively repaired every year since being laid.

"I think the pavement is the worst selection that the borough of St. Mary's could have made, and to say that everybody is heartily sick of it would be expressing it mildly. The same is an imposition upon the public to such an extent that a large number of property owners, including the writer, will not pay any assessment therefor unless compelled to do so by a judgment of the Court."

Last fall, one of the asphalt paving companies laid a so-called "asphalt macadam pavement," said to be "as good as" bitulithic, on Willett street and on an alley leading into Willett street, in Rome, N. Y. The pavement is in a very unsatisfactory condition, as shown by the accompanying half-tones, and has already required and received considerable repairs, notwithstanding the traffic is very light, and that it has been protected by snow, with the exception of about six weeks, since it was laid. The present unsatisfactory condition, therefore, is the result of less than six weeks' very light traffic. On the other hand, our representative reports that the bitulithic pavement, laid for a mile on James street, the leading residence street of Rome, by the Warren Brothers Company, three years ago, is in excellent condition. The taxpayers who were interviewed generally agreed that it is the best pavement in the city of Rome.

All of these pavements were laid under persistent protestation that the pavements, if contracts were awarded to the experimenter, would be "as good as" bitulithic and were laid under processes endeavoring to copy those of the bitulithic construction. They all combine to illustrate the difference between the real thing and the "as good as"—the pavement laid under scientific methods of those who have experience in bitulithic construction and the unscientific, inexperienced, "rule of thumb" methods of its imitation.

Winslow Voting Machine in Grand Rapids

At a municipal election held in Grand Rapids, Mich., last April, the automatic voting machine was used. As in similar instances elsewhere, the machine demonstrated its superiority over the old methods of recording the wishes of the people. Machine voting is more accurate, rapid, economical and satisfactory in every respect than the ordinary method.

The Grand Rapids *Post* the morning after the election had this to say about the working of the "Winslow":

"Only one voting machine was used in yesterday's election, the Winslow, which was operated in the first precinct of the Twelfth Ward. Here the returns were made known immediately on the closing of the polls. The vote on the superior judges was announced in less than one minute from the time the clock struck five and in another minute was being given to the compositors of the *Post*.

"The voting machine was pronounced a great success by all who voted on it. The voters said it was simple and easily manipulated. It gave entire satisfaction to the inspectors, making light work for them and the clerks, and proved very expeditious in receiving the votes. At one time during the voting fifty-seven votes were cast in forty-five minutes, and the instructor gave each of the fifty-seven a few words of instruction as he passed into the booth.

"The ability of the machine to handle split votes was also tested, as the vote for the judges show. The vote on the amendments and bonding propositions were also variously cast. The agent says that one man cast a vote split in every possible manner and recorded his wishes on the bonds and amendments without remaining in the booth more than seventeen seconds."

The inspectors of elections in the First Precinct of the Twelfth Ward gave their unqualified endorsement of the machine, as follows:

"The Winslow automatic voting machine was officially used in the First Precinct, Twelfth Ward, city of Grand Rapids, Michigan, in the election held Monday, April 3, 1905, and we take pleasure in stating that the machine was perfectly satisfactory in every respect both to the voters and the election officials. No difficulty was experienced by the voters in operating the machine. At one time during the day fifty-seven votes were cast in forty-five minutes, and without exception all voters were well pleased with the machine.

"Within two minutes after closing the polls the result from the head of the ticket was given to the newspapers, and in twenty minutes the entire vote was tabulated.

"The machine was shown to be a great improvement over the old system of voting, and we unhesitatingly give this machine our unqualified approval. (Signed) Jas. T. Hood, chairman; Marve Butcher, inspector; Philip L. Faulk, inspector; Jacob Bas, Jr., inspector; Arthur L. Beers, clerk; Jess. W. Clark, clerk."

On April 12th the Winslow voting machine was officially approved

by the Indiana State Voting Machine Commissioners, at Indianapolis. It already had the approval of Ohio and Illinois boards, and these three States are the only ones to which the Winslow Voting Machine Co., Cleveland, O., manufacturer of this automatic voting machine, has applied for the approval of the State board. It is expected, however, that every State which permits the use of machines in elections will have the opportunity of investigating and passing upon the merits of the machine at an early date.

Sanitary Street Flushing

AMERICAN cities have some of the best pavements in the world, but not the best system of cleaning. In the latter case, however, the fault does not rest with the manufacturer but more with the system of government. The administration of municipal affairs in this country often prevents the establishment of desirable systems for doing municipal work, such as street cleaning.

The makers of the sanitary street flushing and sprinkling machine believe, however, that they have found a solution for one of the difficulties in this direction that most American cities have to contend with. They believe that they have answered the question, "How can we most economically, satisfactorily and sanitarily clean our streets?"

SANITARY STREET FLUSHING AND SPRINKLING MACHINES AT WORK ON ST. LOUIS STREET

This machine has been used for several years in the city of St. Louis, and according to the testimony of Street Commissioner Vardmann of that city, "It has given complete satisfaction, both as to character of work done and from a standpoint of economy. It is the best method known to this department that will effectually cleanse the street." Mayor Tom L. Johnson, of Cleveland, in June, 1903, said: "The machines of the Sanitary Street Cleansing & Sprinkling Machine Company, of St. Louis, Mo., clean the streets better than any other system I have ever seen, not only in the matter of efficiency and economy, but especially from a sanitary standpoint. It seems to me that any municipality that desires clean and sanitary streets should employ this system." The cities of Louisville, Worcester, Mass., Fort Worth, Texas, and others give the same testimony as to the excellence of this method of cleaning streets. Fuller information may be secured by addressing the Sanitary Street Cleansing & Sprinkling Machine Company, of St. Louis, Mo.

—"The Adirondacks and How to Reach Them" is a nice folder with maps and references to localities, hotels, boarding houses, mountains and rivers in the great wilderness of Northern New York known as the Adirondack Mountains. If you visit this region once, you will be sure to go again. A copy of "The Adirondack Mountains and How to Reach Them" will be mailed free, postpaid, to any address, on receipt of a two-cent stamp, by George H. Daniels, General Passenger Agent, Grand Central Station, New York.

Items of Interest about the Trade

—Mr. C. F. L. Brown, of Brown Boverie & Cie., has been chosen by the Administration County of London and District Electric Power Company, to plan for the construction of three electric plants for generating current to supply the whole of London and those suburbs controlled by the London County Council. Each plant is to consist of six turbo-generators, each of 10,000 kilowatts normal and 20,000 maximum capacity, making a maximum total of 360,000 kilowatts.

—The Stanley Electric Company and the General Incandescent Arc Light Company have consolidated, the new corporate title being Stanley G. I. Electric Manufacturing Company. The officers are, William Murray Crane, president; C. C. Chesney, first vice-president; M. D. Barr, second vice-president, and M. J. Insull, third vice-president.

—At a recent conference of the branch office sales managers and the general officers of the International Steam Pump Company, the announcement was made that Mr. F. H. Jones, formerly manager of the Air Compressor Department, would assume the duties of general sales manager and take up the organization of a comprehensive and thoroughly co-ordinative sales department, similar to those recently organized by several of the large corporations. The International Steam Pump Company controls the Henry R. Worthington concern, having new and extensive works at Harrison, New Jersey; the George F. Blake Manufacturing Company and the Knowles Steam Pump Works, located at East Cambridge, Mass.; the Laidlaw-Dunn-Gordon Company, of Cincinnati, Ohio; the Snow Steam Pump Works and the Holly Manufacturing Company, of Buffalo, N. Y.; the Deane Steam Pump Company, of Holyoke, Mass., and the Clayton Air Compressor Works, of Brooklyn, N. Y. Mr. Jones is a graduate of Cornell University, class of 1880, and has been engaged in this work since that date.

—In response to a recent call, there gathered at the Hardware Club in the Postal Telegraph Building, New York, April 27th, representatives of about thirty manufacturers, to perfect the organization of what is known as the "Technical Publicity Association." The committee of arrangements secured as the guest of honor Mr. Emerson P. Harris, who delivered an address on the "Machinery for Marketing Machinery." The following officers were elected: Mr. Philip P. Kobbe, president; Mr. H. N. Cleaver, vice-president; Mr. C. B. Morse, second vice-president; Mr. George H. Gibson, secretary; Mr. H. M. Davis, treasurer.

—The *Kansas City Times* has the following to say about the flushing machines recently purchased by that city: "Three street flushing wagons cleaned fifty blocks of asphalt and brick paved street recently. Fourteenth street, east to Par avenue, and several streets in that part of the city, are probably cleaner to-day than they have ever been before. 'These machines cleaned fifty blocks in eight

hours, and cleaned them well,' said W. C. Brooks, superintendent of the Street Department. 'Our old wagon with the long hoses cleans ten blocks in that time. The cost of machine cleaning greatly reduces the expense.' S. Y. High, of the Water Department, estimates that the machines use only one-tenth as much water as is used by the old method."

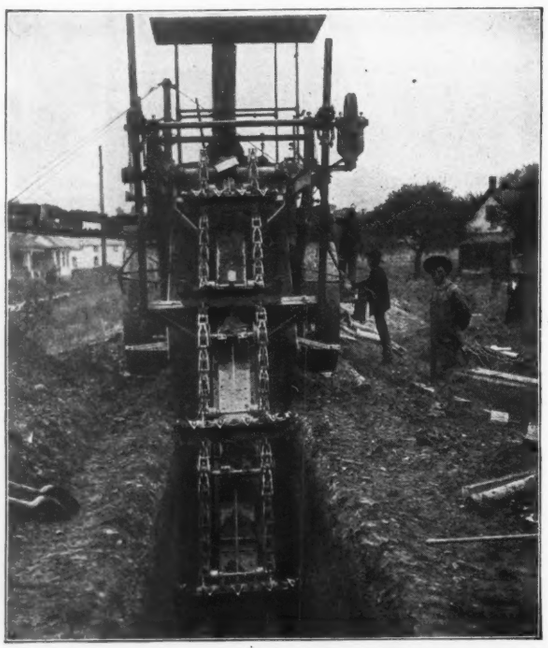
"The Ideal Dump Wagon"

"STUDEBAKER quality" stands for first-class material, skilled workmanship, inventive genius and the best in its line, at least so say those who have bought the products of the Studebaker Brothers Mfg. Co., South Bend, Ind. One of the latest additions to their extensive line of manufactured articles is what is known as the

"Ideal Dump Wagon," shown in the accompanying illustration. The makers assert that they are satisfied that they have in this wagon an article that will find favor with contractors everywhere. This will have especial significance when it is remembered that it bears the stamp of the Studebaker quality all through. They believe that they are not claiming too much when they say that the "Ideal" represents the most advanced type of dump wagon made to-day. Fuller particulars, including price list, may be had on application to the company.

The Chicago Sewer Excavator

IF it were not for the assistance of machinery for all classes of municipal work, the development of American municipalities would progress more slowly than it does. This is particularly true in the construction of sewers. The depth of sewer trenches varies so, and



in some instances is so great, that if they had to be dug and filled by hand it would require much more time and labor. The Chicago sewer excavator, however, simplifies the problem, for it is one of the practical machines which will excavate narrow trenches to any depth up to twenty feet. This machine is fitted with attachments so that trenches tweny-seven, thirty-two, thirty-six, forty-eight and sixty inches wide may be dug. The change from one width to another is readily made by simply changing the buckets.

The machine is so perfect in all its parts that it will operate in any kind of earth that is free from rock and large boulders, and under favorable conditions will easily excavate 300 cubic yards per day. The machine is portable, and it is not necessary to take it down in moving it from place to place. It will travel over ordinary roads at the rate of two miles per hour and is ready for business as soon as it may arrive on the line of the trench. Where required, sheeting can be set close up to the excavator and the sewer built to within a few feet of the same. This machine is so constructed that its entire weight is supported on the surface in advance of the cut, which totally relieves the sides of the trench from any weight, thus preventing cave-ins. Fuller particulars may be secured by sending for circular 137 to the Municipal Engineering & Contracting Company, Railway Exchange, Chicago, Ill.

Speed With Safety

FIRE commissioners and chiefs in this and other countries have been using rubber tires for several years on the fire apparatus. There are some departments, however, which have not yet appreciated the many advantages obtained by the use of rubber tires. A well-known fire chief recently said: "If all fire departments would consider the advantages gained by the use of the 'Firestone' side-wire tires, they would not hesitate in their choice. They hug the pavement better than iron tires and prevent swinging when sluing around corners, thereby permitting turns to be made at top speed. The 'Firestone' side-wire method of fastening is so good that it is impossible for the tires to roll off, and users of these tires are unanimous in their expressions of approval as to the satisfaction they give."

The Firestone Tire & Rubber Company, Akron, Ohio, will cheerfully furnish estimates and send a booklet to all who write for same, illustrating engines and reels equipped with its tires.

Publications Received

—The Pittsburg-Buffalo Company, Frick Building, Pittsburg, Pa., has recently issued a 16-page pamphlet with cover, printed in colors, entitled, "Are You Figurin' on Coal?" In addition to being one of the largest coal producing companies in the country, this concern deals in paving brick and sewer pipe of all kinds.

—The Climax Fence Post Company, of Marquette Building, Chicago, is sending out a small card with an embossed reproduction of its "Climax Sign Post." The specifications of this post are also given. Price and particulars can be secured by addressing the company.

—The Kelly-Springfield Road Roller Company, Springfield, O., is sending out a folder beautifully printed in colors and reproducing in fac-simile the official award ribbon and medal issued by the Louisiana Purchase Exposition, awarding the grand prize to this company for steam road rollers. It also contains beautiful half-tones showing many of the styles of road rollers made, and some of them at work.

—The American Dittler Sewage Disposal Company, 1123 Broadway, New York, has issued a prospectus descriptive of its method of biological or bacteriological sewage purification. This prospectus will be sent to any address upon request.

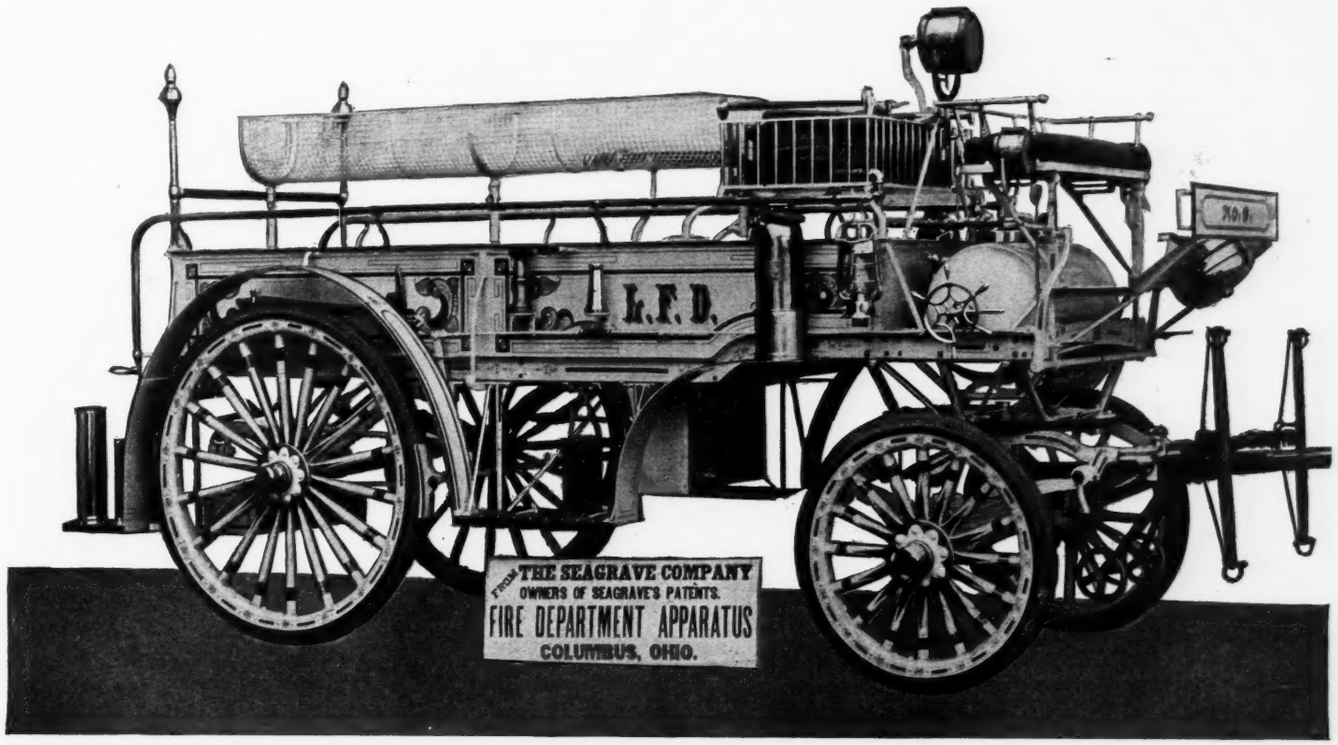
—The "Everbest Magazine," published by the Ewing-Merkle Electric Company, 1106 Pine street, St. Louis, contains many a hearty laugh, and can be had for the asking. Incidentally it tells about the products of its manufacture. It is worth sending for.

—The Central Foundry Company, of 116 "N" Nassau street, New York City, has just issued a 64-page illustrated catalogue. It lists a complete line of 12 and 14-inch pipe and fittings, not found in previous catalogues. The phenomenal increase in the use of "Universal" pipe is graphically portrayed on one of the pages of the catalogue by three cuts, the smallest showing the amount used in 1902, the next that for 1903, and the still larger cut showing the amount used in 1904. This should be seen to be appreciated. The catalogue can be had for the asking.

Special Combination Hose Wagon

CHIEF TYSON, of the Louisville Fire Department, together with his mechanical engineer, has just had constructed by the Seagrave Company, of Columbus, Ohio, what he believes to be the most complete piece of apparatus of its kind in service in the United States. The body, frame, side steps, seat, toe-and foot-board and dash are all of steel. The wheels are Archibald, fitted with Brown roller bearings and 3½-inch "Firestone" side-wire rubber tires, and an extra front and hind wheel is furnished with the wagon. The track is 6 feet out to out. The body is provided with a false bottom, and under the false bottom is carried some light extension ladders, the extra nozzles, etc. The body proper is divided by a partition in two sections: one having a capacity for 600 feet of 3-inch hose; and the other for 800 feet of 2½-inch hose, while on top of the partition is placed an oval basket for carrying hats, clothing, etc. Both the partition and basket are removable.

The chemical engine is a 60-gallon copper cylinder with 200 feet of 1-inch chemical hose. There are also two 3-gallon hand extinguishers placed on the side of the wagon.



Over the chemical hose basket and back of the driver's seat is placed a 9-inch acetylene searchlight, which can be directed at any angle required. At either side of the driver's seat is placed a 6-inch acetylene side-light, which are supplied with gas from generators, or reservoirs, placed under the body just back of the front wheels and piped to the lamps.

Over one of the side steps is placed a large deluge nozzle with extra tips. On the other side is placed a three-way "Glazier" turret nozzle, with two 2½-inch and one 3-inch inlet provided with automatic valves.

The entire machine is painted white, with elaborate and handsome decorations in gold leaf with contrasting colors. The exposed metal parts are all nickel plated and the workmanship and material used in the construction of this apparatus are the best that money would buy, while the iron work is especially noticeable for its smooth finish and adaptability for the purpose required. The price of such a piece of apparatus is $4,500.

—The New Orleans Railways Company, of New Orleans, La., has issued a beautiful brochure of 32 pages, with cover, in which full-page views are given of some of the most attractive electrical illuminations of the Mardi-Gras, celebrated in March, 1905.

Water-Works Exhibit

THE annual exhibition of water-works machinery and general equipment, held in connection with the convention of the American Water-Works Association, at West Baden, Ind., May 8th to 13th inclusive, was unusually large this year. The convention was never held in a place where the exhibits could be so attractively arranged as at West Baden. The following is a list of concerns represented:

Buffalo Meter Co., Buffalo, N. Y.; Hersey Mfg. Co., Boston, Mass.; International Steam Pump Co., New York City; Neptune Meter Co., New York City; Pittsburg Meter Co., East Pittsburg, Pa.; Union Water Meter Co., Worcester, Mass.; National Meter Co., New York City; Henry R. Worthington, water meters, New York City; Ludlow Valve Mfg. Co., Troy, N. Y.; A. P. Smith Mfg. Co., Newark, N. J.; Rensselaer Mfg. Co., Troy, N. Y.; Safety Meter Lock Co., Columbus, O.; H. Mueller Mfg. Co., Decatur, Ill.; Central Foundry Co., New York City; Modern Iron Works, Quincy, Ill.; Lead Lined Iron Pipe Co., Wakefield, Mass.; The Sanitary Co., Cleveland, O.; The Pleuger & Henger Mfg. Co., St. Louis, Mo.; General Chemical Co., Chicago, Ill.; Bourbon Copper & Brass Works, Cincinnati, O.; Ellis-Ford Pipe Cutter Co., Great Falls, Mont.; U. S. Cast Iron Pipe & Foundry Co., Chicago, Ill.; Glauber Brass Mfg. Co., Cleveland, O.; R. D. Wood & Co., Philadelphia, Pa.; Ross Valve Co., Troy, N. Y.; Chapman Valve Mfg. Co., Chicago, Ill.; Farnan Brass Works, Cleveland, O.; Jas. B. Clow & Son, Chicago, Ill.; Chicago Bridge & Iron Works, Chicago, Ill.; Universal Pipe Co., Chicago, Ill.; American Steel Wire Co., Chicago, Ill.; Hayes Mfg. Co., Erie, Pa.; Builders' Iron Foundry, Providence, R. I.; De Laval Steam Turbine Co., Trenton, N. J.; H. W. Clark, manufacturer Clark Meter Box, Mattoon, Ill.; The Pitometer Co., 220 Broadway, New York City; International Brass & Metal Co., Minneapolis, Minn.; Water-Works Equipment Co., 180 Broadway, New York City.

The souvenirs distributed by some of the meter companies are attractive and useful.

The Neptune Meter Co., 120 Liberty street, New York, issued a vest pocket memorandum book.

The Pittsburg Meter Co., East Pittsburg, Pa., distributed a vest pocket memorandum book containing a large amount of useful information relative to the equipment and administration of water-works plants.

The A. P. Smith Mfg. Co., Newark, N. J., distributed sterling silver match safes of a beautiful design and finish.

The H. Mueller Mfg. Co., Decatur, Ill., gave away a beautiful little pin with its monogram.

The Union Water Meter Co., Worcester, Mass., gave away an aluminum card counter with its imprint on the face.

Henry R. Worthington Meter Co., New York City, distributed an attractive cigar ash receiver.

The Chicago Bridge & Iron Works, Chicago, distributed a small clock, convenient for the desk.

Emerson Quick Cleaning Strainer and Foot Valve

The strainer foot valve, manufactured by The Emerson Steam Pump Co., Alexandria, Va., is said to be "the best device of its kind in existence." Engineers who have witnessed its working declare it to be simple, efficient, reliable, durable, economical and applicable to any pumping device.

It is claimed to be an entirely new departure, and the only one in existence in which the entire strainer can be quickly raised from its position at the lower end of the suction pipe, cleaned, and lowered into position again without disconnecting anything whatever; without the use of wrenches or tools of any kind, or raising the suction pipe out of the water. It enables the pumping operator to keep the strainer clean, and insures a full and clear opening for the flow of water into the suction pipe at all times, without delay or vexation.

THE STRAINER OPEN

The strainer is made of perforated steel, riveted to a substantial top casting, which prevents its breaking from any blow it might receive from bucket, stones, tools, etc. It contains many times the suctional area of the pipe upon which it is used. The top casting, or bonnet, fits loosely, and slides on the suction pipe, which acts as a guide.

The advantages of the foot valve are by no means secondary to those of the strainer. It will be seen by referring to the accompanying illustration that the valve is made extra heavy and contains many advantages not derived from the use of the ordinary foot valve. The valve gate has no spindle, spring or hinge, and operates freely in guides provided in the valve body. This obviates the objectionable features of crimping the gate and bending the spindle or breaking the hinge caused by material getting over the valve seat when the pressure is great enough to do so.

A more extended description of this valuable device, together with price list of varying sizes, will be sent to any address upon application to the company.

Publications Received

—"The Blue Book of Air Compressors" is the title of a 32-page booklet recently published by The Ingersoll-Sergeant Drill Company, of New York; works, at Easton, Pa., and Philipsburg, N. J. It is beautifully printed and illustrated, and tells all about air compressors. Those interested should have a copy on file.

—"The Universal Two-Wheel Roller" is the title of Circular No. 44, recently issued by Julian Scholl & Co., 126 Liberty street, New York. It is well illustrated and contains descriptive matter relative to the road rollers, stone crushers and other products of this company.

—The Hammond Typewriter Company has just issued Volume I., No. 1, of the *Hammond Herald*. The first number is largely devoted to a biography of the Hammond typewriter, and a description of the New York City Hammond branch. It also contains interesting descriptions of the various uses to which the typewriter may be put, as well as valuable information for the use of stenographers. It is unique in its typography, as all the articles contained therein are first written on the Hammond typewriter and then reduced to a line cut and so printed from these plates. A copy of this unique publication may be had by addressing The Hammond Typewriter Company, 167 Broadway.

Items of Interest About the Trade

—The Acme Road Machinery Company, Frankfort, N. Y., will repair any kind of road-making apparatus made by any concern in the country. This is a new branch of this company's work.

—The Pacific Flush Tank Company, Chicago, makers of automatic syphons for flushing sewers and operating sewage filters and septic tank systems, has removed its offices to "The Temple," 184 La Salle street, Chicago. Its New York office is located at 42 Broadway.

—Mr. W. S. Shields, 1715 Marquette Building, Chicago, recently put on the market a new appliance for automatic operaing sluice, gate or flap valves, either single or in series. These may be used as time valves for draining filters or contact beds.

—If your sewers need cleaning, The Healey Sewer Machine Construction Company, of Boston, Mass., wants to know it. Its sewer cleaning machine is in successful operation in all parts of the country. Address the company at 10 Tremont street, Boston.

—The Marinette Gas Engine Company, of Chicago Heights, Ill., will be glad to send to any address, upon application, its illustrated Catalogue "H," which describes its gas and gasoline engines.

—The Standard Vitrified Conduit Company, 39 Cortlandt street, New York City, has more contracts under way than at any time in its history. It makes all sizes of conduits, and is now furnishing large supplies to the Bell Telephone interests; for the construction of tunnels under the North and East rivers, New York City; for the underground rapid transit, New York City, and for the New York Central and the Pennsylvania improvements as well as to numerous other large concerns throughout the country.

—The Alphons-Custodis Chimney Construction Company, New York, is now manufacturing paving brick as well as chimney brick. It has a branch office in Kansas City, Mo., in charge of M. F. Erbs.

—The city officials who are interested in the subject of sewage disposal may obtain valuable information by writing to The Cameron Septic Tank Company, Monadnock Block, Chicago, Ill.

Artesian Wells in Australia.—Artesian wells have been sunk to much greater depths in South Australia than in other parts of the world, and are producing copious supplies of water. The government has already expended $3,217,000 on wells, reservoirs and borings, and though the actual revenue is as yet small the indirect advantages are great. Eighteen wells are reported, but four of which are less than 1,250 feet deep, and two are over 4,400 feet deep. The aggregate daily supply from these wells is estimated at 8,626,000 gallons, or a general average of nearly half a million gallons for each well. The water flowing from the Mount Garson well, 4,420 feet deep, reaches the surface at a temperature of 204 deg. Fahr. The government has also expended more than $18,000,000 on other work for supplying water to towns, the principal sources of which are running streams. These works are paying about 2¼ per cent. on the investment. The Adelaide water works have cost completed over $8,000,000 and pay over 3¼ per cent. per annum.

1807
GENERAL LIBRARY,
UNIV. OF MICH.
MAY 31 1905

MUNICIPAL JOURNAL AND ENGINEER

VOL. XVIII. NO. 6

Price 25 Cents
$2.00 per Year

JUNE, 1905

A MONTHLY JOURNAL
DEVOTED EXCLUSIVELY
TO
PUBLIC IMPROVEMENTS
AND
MUNICIPAL PROGRESS.

PAVING, ROAD MAKING,
STREET CLEANING,
PUBLIC LIGHTING,
WATER SUPPLY, PARKS,
GARBAGE DISPOSAL,
SEWERS, SANITATION,
PUBLIC WORKS,
FIRE SERVICE,
ETC., ETC., ETC.

MUNICIPAL JOURNAL PUBLISHING CO
140 NASSAU ST. NEW YORK

Index to Advertisements, Page 7 Table of Contents, Page 3

Sanitary Street Cleaning

An Accomplished Fact

And Steadily Gaining Headway Among Progressive Municipalities.
The means to this long desired end is the

SANITARY STREET FLUSHING MACHINE

"The Only Practical Method of Street Flushing"

"The Street Flusher That Made St. Louis Famous"

MACHINES WORKING ON FIFTH AVENUE, NEW YORK CITY.

We don't ask you to take our word only. In fact we would rather you wouldn't, for the *actual* performance of our machines and their *record* of constant service in the various street cleaning departments, is far greater endorsement than anything we could possibly say. Wherever tried our machines are *successful,* wherever used they have become *indispensable.* Ask the Street Departments of Cleveland, Ohio, Kansas City, Mo., Louisville, Ky., New Orleans, La., East St. Louis, Ill., Ogden, Utah, St. Louis, Mo., and other places where our flushing machines are now giving satisfactory service on *every* kind of pavement.

Surely this is worth investigation.

A street cleansing machine, which has so practically demonstrated its superior powers, *is certainly too valuable* to be overlooked.

All we ask is *your* name and address. This will give us the opportunity of placing before you some illustrated printed matter showing just what our machine is doing to revolutionize street cleaning methods. It is a most interesting record. Please write us while you have the matter in mind. *Now* is the time.

Sanitary Street Cleansing and Sprinkling Machine Company

(Sole owners Murphy Patents for the United States)

Factory and General Office:
Second and Douglass Streets

Contracting Office:
Suite 1318-22 Chemical Building

ST. LOUIS, U. S. A.

Victoria Acetylene Generator

CHANGES THE WHOLE SITUATION IS ABSOLUTELY SAFE

We have a standing offer of $100 to any person who can suggest any way by which this generator can be made to do damage.

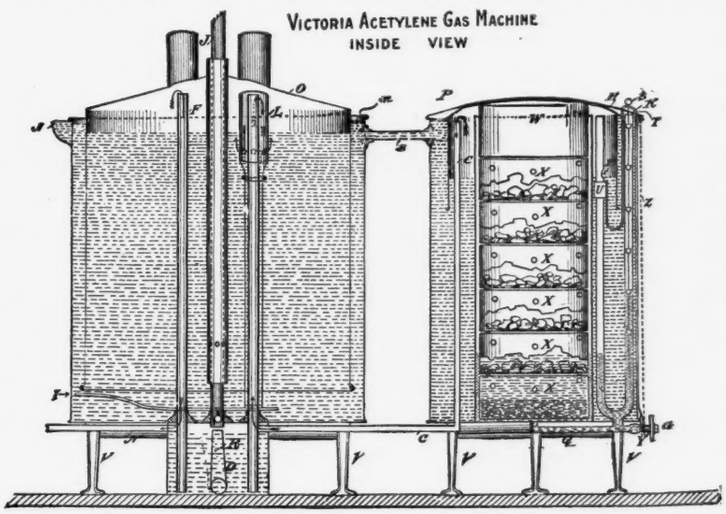
For Town Lighting it gives the most Gas for the Least Money, Results—DIVIDENDS

2 x 3-12 **lump carbide** gives 20% more gas than the granulated, therefore a drop feed generator using a smaller size is not to be considered.

To obtain the best gas cool generation must be produced. The **Victoria** does this.

Labor costs money. The **Victoria** requires the least time and attention. There are many other points that make it by far the best system for town lighting. An examination of our drawings, etc., which we mail on application, will convince you that we do not overstate a single point.

There are town plants using granulated carbide that pay, but if they used the "**Victoria**" with its many advantages, including the use of **lump carbide**, they would pay better.



This Acetylene Generator has but one working part—a lever—and no valves to get out of order.

Remember, the **Victoria Generator** is operated by a natural hydrostatic and not a mechanical law. It has no valves, rubber gaskets, stuffing boxes, cams, springs, toggle joints, uses the largest size carbide, uses less water, makes absolutely cool gas, has fewer parts and is the easiest generator in the world to operate.

Besides town plants, we have hundreds of smaller generators from 20 up to 500 lights, in successful operation, with hundreds of testimonials.

N. B. **If your town is still in darkness, or only lighted with smelly, smoky kerosene, write to us and we will be pleased to mail you full information just how to promote a perfect acetylene town lighting system, and to make good money honestly and conservatively in connection therewith. After giving us certain information, if your town is a good field we will send a representative to confer with you and pass judgment on the locality, and whether it would be a financial success.**

JOHN SIMMONS COMPANY

See Descriptive Article in April Issue. **96-110 CENTRE ST., NEW YORK CITY**

Mention Department A G

A MODEL SYSTEM OF STREET LIGHTING

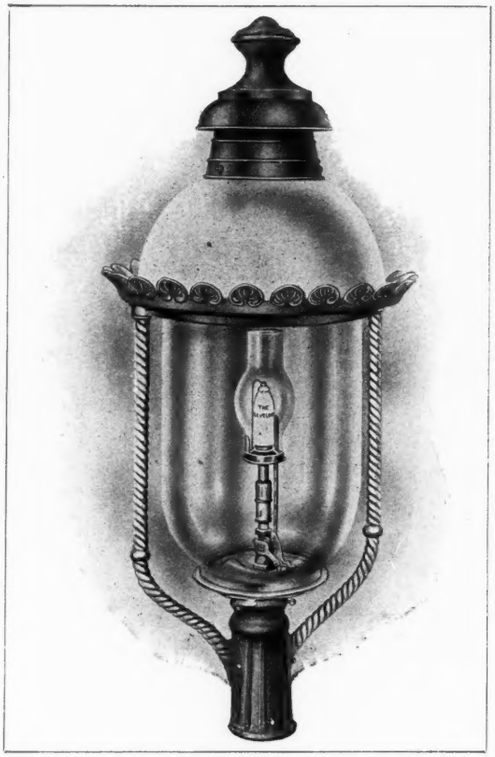
IS the result of using the mantle gas or naphtha lamp in connection with the electric arc. Street lighting experts agree upon this statement:

WHY THE MANTLE LAMP IS PREFERABLE

It affords a better distribution of light.
It lights shaded streets perfectly.
It is the most economical any city can adopt.

The CLEVELAND SYSTEM is SUCCESSFUL

indicated by our being again awarded the contract with the City of St. Paul for 6,500 lamps. Minneapolis awarded us a contract for 3,500 lamps because of the success of our St. Paul contract. Pittsburg has just contracted with us for 4,000 lamps. Some of the other cities using our lamps are Boston, Charleston, Memphis, Muscatine, Ia., Lincoln, Neb., Madison, Wis.



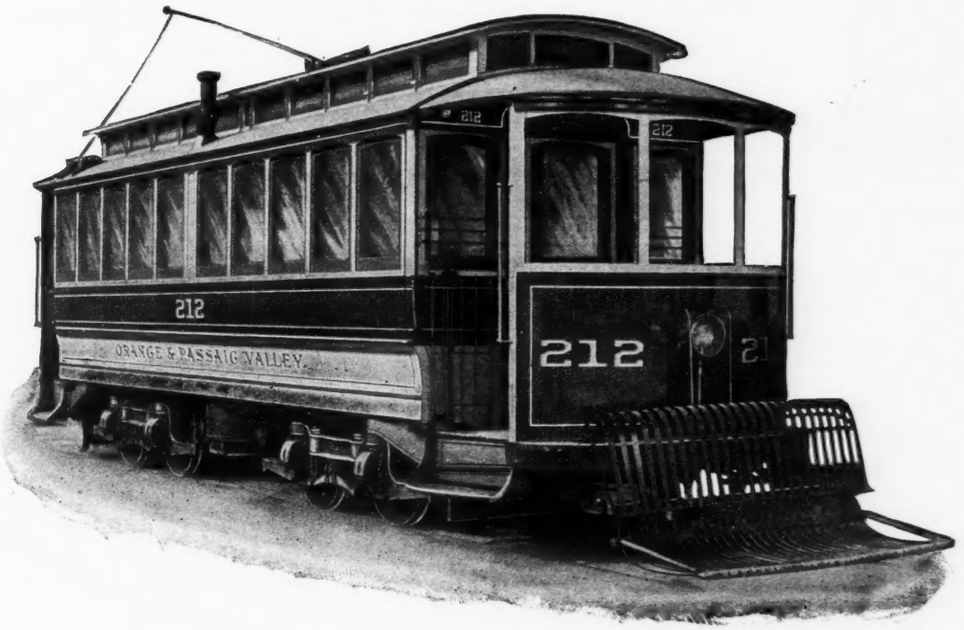
Our Boulevard Gasoline Lamp makes it possible to obtain the same results as from the gas lamp where gas mains do not extend. We will guarantee any town or city a big saving in its lighting bills and a service that cannot be equalled. Write us for particulars. ... ...

CLEVELAND STREET LIGHTING CO.

CLEVELAND, OHIO

MINNEAPOLIS, 523 N. Y. Life Bldg. NEWPORT, R. I. ST. PAUL, 370 Jackson St. NEW YORK, 1 Broadway

CAR FENDERS



OUR NEW MODEL "C" CAR FENDER

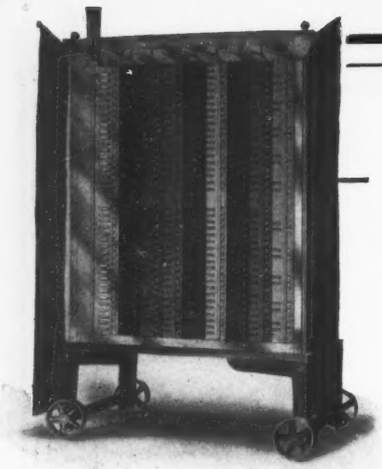
If what we claim for the "**PROVIDENCE**" Fender as a Life Saver is true, it should be attached to every Electric Car.

If what we claim is not true, why is it that over 250 Electric Roads are equipped with this fender, and that there are more than 17,000 "PROVIDENCE" FENDERS IN DAILY USE?

The Consolidated Car Fender Co.

39-41 Cortlandt Street

New York



Winslow Voting Machines

(ENTIRELY AUTOMATIC)

Adjustable for Class Voting, Minority Representation Voting, Cumulative Voting, Amendment and Proposition Voting, and Restrictive Voting.

Manufactured by

Winslow Voting Machine Company, Cleveland Ohio

For the Perfect Equipment of Municipal Offices

NO material is better than Steel. Important documents and records, practically **irreplaceable,** are often kept in hazardous wooden cases, and a small fire inflicts irreparable damage. : : : : : :

With Steel it is different

Berger's Steel Document Files

(Curtained)

Our devices cover the ENTIRE RANGE of office requirements. We make SPECIAL DEVICES to order. Send us your plans, or tell us your wants, and we'll give them prompt attention.

Our Steel Catalogue 26 S Free

THE Berger Mfg. Co.
CANTON OHIO

BURGLARS or FIRE

Cannot touch your valuable papers, books and records if you use our safes or vaults. We furnish absolute security. Send for catalogue of all styles and sizes. Bargains in second-hand safes. .. ..

HERRING-HALL-MARVIN SAFE CO.

400 BROADWAY, NEW YORK

Largest Builders of Bank Vaults in the World.

Crown Sanitary Flooring

Lith Wall and Floor Insulation,

Fibre Felt and Rock Fibre Wool Deadening

Asbestos Building Papers, Roofing and Mineral Wool

ROBERT A. KEASBEY CO., 100 N. Moore St., New York
56, 58 PEARL ST., BUFFALO

1884 Twenty

The Typewriter for All Nations and Tongues

1904 Years

The No. 2 "New Manifolding"

HAMMOND TYPEWRITER

FIRST GOLD MEDAL, St. Louis, 1904

New Orleans Visible

The Hammond Typewriter Co.

Factory & General Offices, 69th to 70th Sts. and East River
NEW YORK, N. Y. N. Y. CITY SALES OFFICE, 167 BROADWAY

Saint Louis Success

INDEX TO ADVERTISEMENTS.

For Buyers' Guide and Classified Business Directory, See Pages 11 and 13.

Acme Road Machinery Co..... 33
Alton Paving, Bldg. & Fire Brick Co. 52
American & Foreign Trading Co... 8
American-La France Fire Engine Co. 15
American Sanitation Co..... 58
American Well Works..... 17
Alvord, John W..... 29
Arthur, W. H..... 50
Atlantic, Gulf & Pacific Co..... 47
Austin Mfg. Co..... 32
Austin-Western Co..... 29

Baltimore Enamel & Novelty Co... 7
Barr Clay Co..... 52
Bartlett, C. O., & Snow Co..... 55
Bassett, Geo. B..... 28
Berger Mfg. Co..... 6
Bessemer Limestone Co..... 53
Books on Municipal Subjects 40, 41, 42
Brossman & King..... 25
Buffalo Clay Mfg. Co..... 51
Buffalo Meter Co..... 18
Buffalo Steam Roller Co..... 43
Byerley & Son..... 55

Caird, Jas. M..... 25
Cameron Septic Tank Co..... 8
Carson Trench Mach. Co..... 28
Central Bitulithic Paving Co..... 10
Central Foundry Co..... 16
Chicago & Alton Ry..... 33
Chicago & Northwestern Ry..... 33
Child, Stephen..... 25
City Wastes Disposal Co..... 24
Clearfield Clay Working Co..... 52
Cleveland Brick Co..... 52
Cleveland Street Lighting Co..... 4
Climax Road Machine Co..... 33
Climax Supply Co..... 7
Clinton Foundry & Machine Co.... 8
Cole, Edw. S..... 16
Collinwood Shale Brick Co..... 52
Columbia Wagon Co..... 46
Conard, W. R..... 28
Consolidated Car Fender Co..... 5
Contractors Supply & Equipment Co. 37
Cutler Mfg. Co..... 28

Davison Foundry Co..... 28
Dee, Wm. E., Co..... 50
DeLaval Steam Turbine Co..... 17
Diggs Fire Extinguisher Co..... 10
Drake Standard Mach. Wks..... 35
Dunning, W. D..... 36

East Ohio Sewer Pipe Co..... 48
Emerson Steam Pump Co..... 17
Erie Machine Shops..... 43
Eureka Fire Hose Co..... 12
Ewing, Wm. B..... 25
Ewing-Merkle Electric Co..... 10

Fabric Fire Hose Co..... 12
Fanning, J. T..... 24
Federal Clay Products Co..... 50
Firestone Tire & Rubber Co..... 14
Flint Brick & Coal Co..... 49

Gamewell Fire Alarm Telegraph Co. 12
Glazier Nozzle & Mfg. Co..... 10
Globe Asphalt Co..... 55

Hague, C. A..... 28
Hammond Typewriter Co..... 6
Harper-Norton Shale Brick Co.... 51
Hawkes, Thomas..... 28
Haywood Wagon Co..... 46
Healey Sewer Machine & Construction Co..... 31
Herring-Hall-Marvin Safe Co..... 6
Hersey Mfg. Co..... 60
Hering, Rudolph, & Geo. W. Fuller 24
Hetherington & Berner..... 54
Hooper, D. H. B..... 7
Hill Cart & Wagon Works..... 44
Howard, J. W..... 25
Hudson Eng'ng & Cont'g Co..... 25
Hungarian-Derna Asphalt Co..... 49

Int. Fence & Fireproofing Co..... 33
International Incinerator Co..... 8
Iowa Engineering Co..... 24

Jackson Filter Mfg. Co..... 16
Jeyes Sanitary Compounds Co., Ltd. 8

Keasbey Co., Robt. A..... 6
Kelly-Springfield Road Roller Co.. 43
Kuichling, Emil..... 24

Lewis & Kitchen..... 28

Marinette Gas Engine Co..... 16
Maslins 16
McAvoy Vitrified Brick Co..... 52
Menzies Street Cleaner Co..... 31
Metropolitan Paving Brick Co..... 53
Morris Machine Works..... 16
Municipal Engineering & Contracting Co..... 26, 27, 37

Nashville Roofing & Paving Co.... 47
National Drill & Mfg. Co..... 46
Neptune Meter Co..... 60
New England Steam Brick Co..... 53
New York Cent. & Hud. River R. R. 39

Ohio River Sewer Pipe Co..... 49
Okonite Co., Ltd..... 60

Pacific Flush Tank Co..... 18
Pitometer Company..... 16
Pittsburg-Buffalo Co..... 49
Pittsburg Meter Co..... 18
Pollard, J. G..... 28
Purington Paving Brick Co..... 53

Republic Chemical & Creosoting Co. 56
Robinson Clay Product Co..... 49

Sanitary Street Cleansing & Sprinkling Mach. Co..... 2
Sanitary Street Sweeping Co..... 31
Scherzer Rolling Lift Bridge Co... 47
Scholl & Co., Julian..... 43
Seagrave Co., The..... 14
Schott, W. H..... 25
Shadbolt Mfg. Co..... 46
Sheffield & Co., O. H..... 25
Shields, W. S..... 8
Simmons Co., John..... 3
Southern Creosoting Co..... 38
Southern Railway..... 39
Standard Fire Brick Co..... 52
Standard Sewer Pipe Co..... 50
Star Electric Co..... 12
Steel Protected Concrete Co..... 55
Stratton Fire Clay Co..... 49
Studebaker Bros. Mfg. Co..... 45
Suburban Brick Co..... 52

Texas & Pacific Coal Co..... 51
Troy Wagon Works Co..... 45

Union Water Meter Co..... 18
Universal Safety Tread Co..... 60
U. S. Sand Filtration Co..... 39
U. S. Wood Preserving Co..... 57

Wadsworth Stone & Paving Co.... 54
Warner, Chas. Co..... 35
Warren Asphalt Paving Co..... 55
Warren Bituminous Paving Co.... 47
Warren Bros. Co..... 59
Warren Construction Co..... 37
Watson Wagon Co..... 44
Weber Steel-Concrete Chimney Co. 35
Western Brick Co..... 52
Wilkes, Paul..... 24
Winget Concrete Machine Co..... 34
Wirt & Knox Mfg. Co..... 31
Winslow Voting Machine Co..... 6
Wise & Watson..... 24
Worthington, Henry R..... 18

N. CHARLES ST.

Enameled Iron Signs for Municipalities

Street Signs — **Road Signs**
House Numbers — **Spitting Prohibited**
Fire Alarms — **Park Ordinances**
Automobile License — **Keep Off the Grass**

We make a Specialty of Signs with any lettering, size and colors

Enamel signs are made on heavy gauge iron, brilliant, attractive, and will stand any climate. Especially adapted for outside use.

WRITE FOR PARTICULARS

The BALTIMORE ENAMEL & NOVELTY CO.

Foot Allen St. — BALTIMORE, Md.

CLIMAX SIGN POSTS

Have no equal for endurance.
Cost ¼ of any other post.

WHY? 1 post on a corner answers for 2 1 lasts as long as any other 2

Made of galvanized pipe and casting set in vitrified shale clay base. Blue enameled signs with white letters.

They NEVER Wear Out

In use at Oak Park and Wilmette, two of Chicago's most aristocratic suburbs

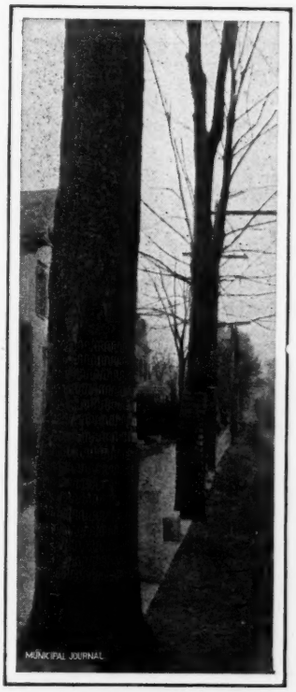
For quotations and other information address

CLIMAX SUPPLY CO.

712 Marquette Building, CHICAGO.

HOOPER'S EXPANSIVE TREE GUARD

PATENTED



THIS guard is, without question, the very best article of the kind ever conceived.

Is neat, easily adjusted, and will last a life-time.

Grows with the tree.

Hardly noticeable but very efficient.

If you want to keep your trees from being ruined by horses, you need this guard.

Write for prices and particulars.

D. H. B. HOOPER

157 Elm Street, ... BIDDEFORD, ME.

Cameron Septic Tank Company

AN APPROVED SYSTEM OF SEWAGE DISPOSAL FOR LARGE AND SMALL MUNICIPALITIES :: :: ::

Satisfactory and Economical

Write for booklet

H. D. WYLLIE, Gen. Manager

812-813 Monadnock Bldg, .. CHICAGO, ILL.

Automatic Controlling Valves

FOR

Sewage Disposal Works

A new appliance for automatically operating sluice, gate or flap valves either single or in series.

Capable of being used as timed valves for draining filters or contact beds, also for discharging contents of a dosing tank onto a number of filter or contact beds in rotation, or of rotating a continuous flow upon a series of beds without loss of head. Simple, reliable and better than siphons.

W. S. SHIELDS, 1715 Marquette Building, Chicago, Ill.

Private Sewage and Garbage Disposal

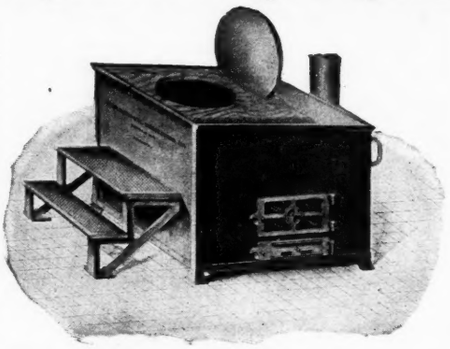
THE double problem of sanitary and odorless disposal of sewage and garbage for Schools, Factories, Hospitals, Hotels and Dwellings, without sewer connections, is solved by the . . . . . .

International Incinerator

Thoroughly practical

Highest recommendations.

Send for illustrated booklet and prices.



INTERNATIONAL INCINERATOR CO., Buffalo, N.Y.

Garbage Incinerating Plants

The problem of how best to dispose of the waste matter of your cities is solved.

Our system though comparatively new has been demonstrated in the operation of the plants which we have erected to be the **BEST.**

PERFECT SANITATION and an **UTTER ABSENCE** of the disagreeable features surrounding the average garbage disposal plant is what **WE HAVE SOUGHT**—and this **WE HAVE ACCOMPLISHED. EVERY FORM** of refuse can be destroyed in one of our incinerators.

No Odorous Gases No Dirt

We will furnish estimates for any size plant desired. Write for particulars.

The Clinton Fdy. & Mach. Co.

95 LIBERTY STREET NEW YORK

" The function of a disinfectant is to disinfect "

"CYLLIN"

The most powerful DISINFECTANT in the world

30 times that of Carbolic Acid

80 times that of Formalin (40%)

&c., &c.

(Germicidal value as proved by exhaustive experiments on vigorous cultures of plague organisms)

NON-POISONOUS—NON-IRRITANT

Contains no Carbolic Acid. Specially recommended in Consumption, Typhoid, Diphtheria, etc.

JEYES' SANITARY COMPOUNDS COMPANY, Ltd.

AMERICAN & FOREIGN TRADING CO.

Sole Agents 100 WILLIAM STREET, NEW YORK

TABLE OF CONTENTS
FOR JUNE, 1905.

CONTRIBUTED ARTICLES.

CIVIC ART IN THE QUAKER CITY 251
CITY MADE CHARTERS (concluded) 257
MILO ROY MALTBIE, Ph. D.
COMBINED PLANTS FOR SMALL TOWNS 261
OSCAR CLAUSSEN
POLITICS AND MUNICIPALITIES 263
GEORGE STEWART BROWN
SYRACUSE WANTS MUNICIPAL LIGHTS 266
PORTLAND CEMENT (continued) 267
E. KUICHLING, C. E.
WATER-WORKS LOSSES 270
A FEW PRACTICAL HINTS 272
S. A. CHARLES

EDITORIAL.

Philadelphia in Disgrace 274
Wanted: A Bureau of Municipal Information 275
The Asphalt Scandal 276
Shall There Be Pipe Galleries in Subway 277
League of American Municipalities 278
A Municipal Exhibit 278
Michigan's New State Highway Department 278
New York's Light Investigation a Fizzle 278
Water-Works Convention 279
PERSONALITIES 279
American Society of Municipal Improvements 280
CONVENTION DATES 281

NEWS AND PRACTICE AMONG THE CITIES.

Two-Cent Fares in England 256
City Government by Commissions 260
Fighting Mosquitoes in Germany 265
Wood Pavements in Hull 273
New York's Can Carrier Street Cleaning System 281
Atlanta's New Garbage Incinerator 282
Liquor License in Halifax 282
Salt Water Fire Protection for San Francisco 282
Concrete Bridges at Newark 283
Ideal Park Conditions 283
A New Automatic Sewer Inlet 284
English Tramways 284
International Association of Fire Engineers 285
Some of New York's Poor Asphalt 286
Municipal Steamboats 287
Municipal Railway for San Francisco 287
Vital Statistics of Germany 288
Leeds Street Car System 289
LITERATURE ON MUNICIPAL TOPICS — BOOKS, AMERICAN PERIODICALS AND PUBLICATIONS RECEIVED 290

ITEMS OF INTEREST ABOUT THE TRADE.

Chemical Fire Extinguishers 292
"As Good As" Bitulithic 293
Winslow Voting Machine in Grand Rapids 294
Sanitary Street Flushing 295
"The Ideal Dump Wagon" 296
The Chicago Sewer Excavator 296
Speed with Safety 296
Water-Works Exhibit 297
Special Combination Hose Wagon 297
Emerson Quick Cleaning Strainer and Foot Valve 298
Items of Interest About the Trade 295, 298
Trade Publications Received 296, 298

"Gyrofan"

JANDUS FANS

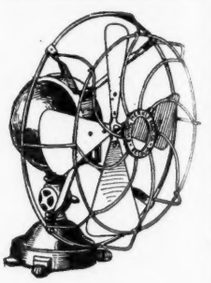
Alternating and Direct Current

The Gyrofan is beyond comparison, distributes twice the volume of air, and consumes 25% less current than the ordinary ceiling fan.

Full Descriptive Bulletins on Application

Ask for Bulletin 7D.

Combination Desk Fan



EWING-MERKLE ELECTRIC CO., St. Louis, Mo.

"WILL NEITHER LEAK NOR LOCK"

Is Always Ready—Never Fails

THE

GLAZIER NOZZLE

Is the Greatest Improvement ever made in Fire Nozzles or Nozzle Systems.
It will remain in position without the use of holders, jacks or stay lines, and will work as well if let alone as when attended either at the end of the hose lines or on wheels.

The only Nozzle that combines Safety and Efficiency with large streams.

NO DEPARTMENT COMPLETE
WITHOUT THE GLAZIER NOZZLE

Write us for further information.

The Glazier Nozzle & Mfg. Co.

INDIANAPOLIS, IND.

THE BITULITHIC PAVEMENT

The Pavement that Appeals Alike to Property Owners and Road Drivers

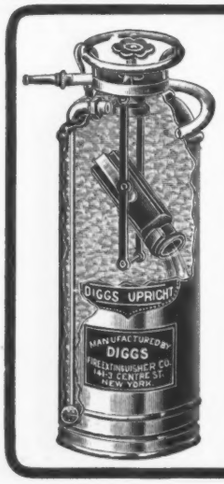
SMOOTH
CLEAN
NOISELESS

Laid and Contracted for In Over NINETY Cities

THE

Central Bitulithic Pavement Co.

DETROIT, MICHIGAN.



Fire Extinguishers

The Diggs Fire Extinguishers have a world wide reputation for absolute safety and efficient service. Wherever fire protection is needed, the Diggs Extinguisher furnishes a reliable safeguard. The various sizes and styles of the Diggs machines form a comprehensive system of fire extinguishment suitable for any and all locations where fire is apt to occur. FIRE DEPARTMENT EXTINGUISHERS A SPECIALTY.

The cut on the left represents the standard 3 gallon machine for warehouse and other purposes. Guaranteed to stand 400 pounds pressure. On the right is shown the 3 gallon size for fire department use. These are equipped with shut-off nozzles and straps if ordered. The 6 gallon fire department machine is built on the same lines, but is always equipped with strap and shut-off nozzle. We guarantee these machines to stand three to four times the pressure that can be generated when discharging.

Write us for catalogue and further information.

DIGGS FIRE EXTINGUISHER CO., 141-143 Centre St., New York

THE MUNICIPAL JOURNAL AND ENGINEER
BUSINESS DIRECTORY

For those seeking Material, Machinery or Special Service for Municipal or Public Work. The names in this List are considered the Leaders in their respective lines. An index to their advertisements on page 6. If you fail to find what you are looking for write to us. ::: :::

Air Compressors.
American Well Works.
Contractors Supply & Equip. Co.

Air Lift Systems.
American Well Works.
Hudson Eng'g & Cont'g Co.

Arc Lamps.
Ewing-Merkle Electric Co.

Artesian Wells and Machinery.
Hudson Eng'g & Cont'g Co.
National Drill & Mfg. Co.

Artificial Stone Machinery.
Winget Concrete Machine Co.

Artificial Stone Sidewalks.
Central Bitulithic Paving Co.
Nashville Roofing & Paving Co.
Warren Bituminous Paving Co.
Warren Brothers Co.

Asphalt.
Byerley & Son.
Globe Asphalt Co.
Hungarian-Derna Asphalt Co.
Wadsworth Stone & Paving Co.
Warren Asphalt Paving Co.

Asphalt Paving.
Warren Asphalt Paving Co.

Asphalt Paving Plants.
Hetherington & Berner.
Wadsworth Stone & Paving Co.
Warren Asphalt Paving Co.

Asphalt Rollers.
Austin Mfg. Co.
Buffalo Steam Roller Co.
Erie Machine Shops.
Kelly Springfield Rd. Roller Co.
Scholl & Co., Julian.

Asphalt Sidewalks.
Central Bitulithic Paving Co.
Nashville Roofing & Paving Co.
Warren Bituminous Paving Co.
Warren Asphalt Paving Co.

Asphalt Tools and Machinery.
Hetherington & Berner.
Scholl & Co., Julian.
Wadsworth Stone & Paving Co.

Automobile Street Sweeper.
American Sanitation Co.

Bitulithic Pavement.
Central Bitulithic Paving Co.
Nashville Roofing & Paving Co.
Warren Bituminous Paving Co.
Warren Brothers Co.
Warren Construction Co.

Blowers, Turbine Driven.
De Laval Steam Turbine Co.

Boiler and Pipe Coverings.
Keasbey, Robt. A., Co.

Books on Municipal Subjects.
Municipal Journal Pub. Co.

Brick, Paving, Building and Sewer.
Alton Brick Co.
Barr Clay Co.
Buffalo Clay Mfg. Co.
Clearfield Clay Working Co.
Cleveland Brick Co.
Collinwood Shale Brick Co.
Federal Clay Products Co.
Flint Brick & Coal Co.
Harper-Norton Shale Brick Co.
McAvoy Vitrified Brick Co.
Metropolitan Paving Brick Co.
New England Steam Brick Co.
Pittsburg & Buffalo Co.
Purington Paving Brick Co.
Robinson Clay Product Co.
Standard Fire Brick Co.
Suburban Brick Co.
Texas & Pacific Coal Co.
Western Brick Co.

Bridges.
Climax Road Mach'y Co.
Scherzer Rolling Lift Bridge Co.

The Broughton Mixer.
Dunning, W. D.

Car Fenders.
Consolidated Car Fender Co.

Carriers, Can and Bag.
Fox Brothers Co.
Wirt & Knox Mfg. Co.

Castings.
Davison Foundry Co.

Cement.
Robinson Clay Product Co.
Warner Co., Chas.
Warren Brothers Co.

Centrifugal Pumps.
DeLaval Steam Turbine Co.
Morris Machine Works.

Chemical Engines.
American-La France Fire Engine Co.
Diggs Fire Extinguisher Co.

Coal Dust Burner.
Bartlett & Snow Co., C. O.

Coal Tar.
Nashville Roofing & Paving Co.
Warren Brothers Co.

Combined Curb and Gutter.
Steel Protected Concrete Co.

Concrete Block Machinery.
Winget Concrete Machine Co.

Concrete Mixers.
Contractors Supply & Equip. Co.
Drake Standard Mach. Wks.
Int. Fence & Fireproofing Co.
Mun. Eng. & Con. Co.
Scholl & Co., Julian.

Concrete Structural Work.
Int. Fence & Fireproofing Co.
Warren Brothers Co.

Conduits.
Standard Sewer Pipe Co.

Contractors' Supplies and Machinery.
Acme Road Machinery Co.
Austin Mfg. Co.
Climax Road Machinery Co.
Contractors Supply & Equip. Co.
Jos. G. Pollard.
Maslins & Sons, John.
National Drill & Mfg. Co.
Scholl & Co., Julian.

Conveyors and Elevators.
Bartlett, C. O., & Snow Co.

Covers, Manhole, Catch Basin and Inlet.
Davison Foundry Co.

Creosoted Wood.
Republic Chemical & Creosoting Co.
Southern Creosoting Co.
U. S. Wood Preserving Co.

Curbing, Steel Bound.
Steel Protected Concrete Co.

Disinfectants.
American & Foreign Trading Co.

Drain Tile.
Dee Co., Wm. E.

Dredging.
Atlantic, Gulf & Pacific Co.

Dump Wagons. (See Wagons.)

Earth Handling Machinery.
Austin Mfg. Co.
Municipal Engineering & Con. Co.
National Drill & Mfg. Co.

Electrical Apparatus and Supplies.
Ewing-Merkle Electric Co.

Engineers and Contractors.
Alvord, John W.
Bassett, Geo. B.
Brossman & King.
Caird, Jas. M.
Child, Stephen.
City Wastes Disposal Co.
Ewing, Wm. B.
Fanning, J. T.
Hague, C. A.
Hawkes, Thomas I.
Hering, Rudolph, & Geo. W. Fuller.
Howard, J. W.
Hudson Eng'g & Cont'g Co.
Iowa Engineering Co.
Kuichling, Emil.
Perkins, Frank C.
Schott, W. H.
Sheffield & Co., O. H.
Shields, W. S.
Wise & Watson.

Explosives.
Explosives Mfg. Co., The

Fencing and Railings.
Int. Fence & Fireproofing Co.

FIRE HOSE

ORIGINAL AND LARGEST MANUFACTURERS OF RUBBER LINED

COTTON HOSE

"EUREKA" "PARAGON" "RED CROSS"

HOSE OF EVERY DESCRIPTION

AWARDED GOLD MEDAL AT ST. LOUIS EXPOSITION 1904

SEND FOR ILLUSTRATED CATALOGUE

EUREKA FIRE HOSE CO.

NEW YORK · PHILADELPHIA · BOSTON · CHICAGO.

Fabric Fire Hose Co.

68 MURRAY STREET, NEW YORK

Write for our Fire Engineer's Hand Book of Hydraulic Tables and First Aid to the Injured.

Patentees and Sole Manufacturers

WAX AND PARA GUM TREATED

FIRE HOSE

THE GAMEWELL FIRE ALARM TELEGRAPH CO.

FIRE ALARM TELEGRAPH SYSTEMS	POLICE SIGNAL TELEGRAPH	AUXILIARY ALARM SYSTEMS

General Offices: 19 Barclay Street, NEW YORK

STAR ELECTRIC COMPANY

MANUFACTURERS OF

Fire Alarm Telegraph Apparatus and Systems

THAT ARE RELIABLE AND STRICTLY UP-TO-DATE

Write and let us tell you how your RUNNING EXPENSES can be REDUCED and

YOUR SYSTEM IMPROVED

Factory and Offices .. .. at .. .. BINGHAMTON, N. Y.

BUSINESS DIRECTORY

CONTINUED FROM PAGE 11

Filing Devices.
Berger Mfg. Co.

Filtration Systems.
Jackson Filter Mfg. Co.
U. S. Sand Filtration Co.

Fence Posts.
Climax Supply Co.

Fire Alarm Systems.
Gamewell Fire Alarm Telegraph Co.
Star Electric Co.

Fire Brick and Clay.
Dee Co., Wm. E.

Fire Department Supplies.
American-La France Fire Engine Co.
Diggs Fire Extinguisher Co.
Fabric Fire Hose Co.
Glazier Nozzle & Mfg. Co.
Seagrave Co., The

Fire Extinguishers.
American-La France Fire Engine Co.
Diggs Fire Extinguisher Co.

Fire Hose.
Eureka Fire Hose Co.
Fabric Fire Hose Co.

Fire Hose Nozzles.
Fabric Fire Hose Co.
Glazier Nozzle & Mfg. Co.

Fireproof Construction.
Berger Mfg. Co.
Int. Fence & Fireproofing Co.

Flue Lining.
Dee Co., Wm. E.
East Ohio Sewer Pipe Co.

Flush Tanks.
Pacific Flush Tank Co.

Garbage Disposal Plants.
Clinton Foundry & Machine Co.
Lewis & Kitchen.

Garbage Disposal, Private.
International Incinerator Co.

Gas Engines.
Marinette Gas Engine Co.

Hoisting Engines.
Contractors Supply & Equipment Co.

Inspector of Iron and Steel.
Conard, W. R.

Lamps, Arc and Incandescent.
Ewing-Merkle Electric Co.

Landscape Architects.
Child, Stephen.

Lift Bridges.
Scherzer Rolling Lift Bridge Co.

Lighting Systems.
Cleveland Street Lighting Co.
Simmons Co., John, The

Mail Chutes.
Cutler Mfg. Co.

Metal Furniture.
Berger Mfg. Co.

Meter Testing Apparatus.
Pittsburg Meter Co.

Paving and Paving Materials.
Alton Paving Brick Co.
Barr Clay Co.
Bessemer Limestone Co.
Buffalo Clay Mfg. Co.
Byerley & Son.
Central Bitulithic Paving Co.
Clearfield Clay Working Co.
Cleveland Brick Co.
Collinwood Shale Brick Co.
Federal Clay Products Co.
Flint Brick & Coal Co.
Globe Asphalt Co.
Hooper-Norton Shale Brick Co.
Hungarian-Derna Asphalt Co.
McAvoy Vitrified Brick Co.
Metropolitan Paving Brick Co.
Nashville Roofing & Paving Co.
New England Steam Brick Co.
Pittsburg & Buffalo Co.
Purington Paving Brick Co.
Republic Chemical & Creosoting Co.
Robinson Clay Products Co.
Standard Fire Brick Co.
Suburban Brick Co.
Texas & Pacific Coal Co.
U. S. Wood Preserving Co.
Wadsworth Stone & Paving Co.
Warren Asphalt Paving Co.
Warren Bituminous Paving Co.
Warren Bros. Co.
Warren Construction Co.
Western Brick Co.

Paving Tools.
Anderson, W. H., & Sons.
Contractors Tool Co.

Pipe.
Central Foundry Co.

Pitometers.
The Pitometer Co.

Pumping Machinery.
American Well Works.
DeLaval Steam Turbine Co.
Emerson Steam Pump Co.
International Steam Pump Co.
Morris Machine Works.

Portable Asphalt Plants.
Heaherington & Berner.
Wadsworth Stone & Paving Co.

Rail Block.
Arthur, W. H.

Road Machinery.
Acme Road Machinery Co.
Austin Mfg. Co.
Climax Road Machine Co.
National Drill & Mfg. Co.
Scholl & Co., Julian.

Road Rollers.
Acme Road Machinery Co.
Austin Mfg. Co.
Buffalo Steam Roller Co.
Climax Road Machine Co.
Erie Machine Shops.
Kelly-Springfield Rd. Roller Co.
National Drill & Mfg. Co.
Scholl & Co., J.

Rock Crushers.
Acme Road Machinery Co.
Austin Mfg. Co.
Climax Road Machine Co.
National Drill & Mfg. Co.
Scholl & Co., J.

Roofing and Roofing Material.
Nashville Roofing & Paving Co.
Warren Brothers Co.

Rubber Tires.
Firestone Tire & Rubber Co.

Safes.
Herring-Hall-Marvin Safe Co.

Safety Treads.
Universal Safety Tread Co.

Scrapers, Wheeled and Drag.
Acme Road Machinery Co.
Austin Mfg. Co.
Climax Road Machine Co.
National Drill & Mfg. Co.

Sewage Disposal.
Cameron Septic Tank Co.
City Wastes Disposal Co.
Lewis & Kitchen.

Sewage Disposal, Private.
International Incinerator Co.

Sewage Pumps.
DeLaval Steam Turbine Co.
International Steam Pump Co.
Morris Machine Works.

Sewer Pipe.
Dee Co., Wm. E.
East Ohio Sewer Pipe Co.
Federal Clay Products Co.
Ohio River Sewer Pipe Co.
Pittsburg & Buffalo Co.
Robinson Clay Product Co.
Standard Sewer Pipe Co.
Stratton Fire Clay Co.

Sewer Cleaning Machine.
Healey Sewer Machine & Const. Co.

Sign Posts.
Climax Supply Co.

Steam Fire Engines.
American-La France Fire Engine Co.

Steam Turbines.
DeLaval Steam Turbine Co.

Steel Concrete Chimneys.
Weber Steel-Concrete Chimney Co.

Steel-Bound Curb.
Steel Protected Concrete Co.

Street Cleaners.
American Sanitation Co.
Menzies Street Cleaner Co.
Sanitary Street Sweeping Co.
Sanitary St. Cleansing & Sprinkling Machine Co.

Street Lamps and Lighting.
Cleveland Street Lighting Co.

Street Flushing Machines.
Sanitary St. Cleansing & Sprinkling Machine Co.

Street Signs.
Balto. Enamel & Novelty Co.

Street Sprinklers.
Austin-Western Co.
Studebaker Bros. Mfg. Co.

Street Sweepers.
Acme Road Machinery Co.
American Sanitation Co.
Austin-Western Co.
Kelly Springfield Rd. Roller Co.
Sanitary Street Sweeping Co.
Studebaker Bros. Mfg. Co.

Switchboards, Fire Alarm and Police Telegraph.
Gamewell Fire Alarm Teleg. Co.
Star Electric Co.

Traction Engines and Road Locomotives.
Buffalo Pitts Co.
Buffalo Steam Roller Co.

Tree Guards.
D. H. B. Hooper.

Trench Machines.
Carson Trench Mach. Co.
Mun. Eng. & Con. Co.

Turbine Engines and Pumps.
DeLaval Steam Turbine Co.

Typewriters.
Hammond Typewriter Co.

Valves for Sewage Disposal Works.
Shields, W. S.

Voting Machines.
Winslow Voting Machine Co.

Wagons and Carts.
Acme Road Machinery Co.
Austin Mfg. Co.
Climax Road Mch'y Co.
Columbia Wagon Co.
Hill's Cart & Wagon Wks.
National Drill & Mfg. Co.
Shadbolt Mfg. Co.
Studebaker Bros. Mfg. Co.
Troy Wagon Wks. Co.
Watson Wagon Co.

Water Analysis.
Caird, Jas. M.

Water Filtration.
Jackson Filter Mfg. Co.
U. S. Sand Filtration Co.

Water Meters.
Buffalo Meter Co.
Hersey Mfg. Co.
International Steam Pump Co.
Neptune Meter Co.
Pittsburg Meter Co.
Union Water Meter Co.

Well Machinery.
American Well Works.
Austin Mfg. Co.

Wheelbarrows.
Anderson, W. H., & Sons.

Wires and Cables.
Okonite Co.

Wooden Pavements.
Republic Chemical & Creosoting
U. S. Wood Preserving Co.

"Firestone"

SIDE WIRE TIRES

To increase the efficiency of your Fire Department, Rubber Tires fitted to your engine and reels are essential.

Fires are more speedily reached, and the wear and tear on your engines reduced.

"Minneapolis Combination Chemical Engine and Hose Cart."

They're Both Beneficial and Profitable

The best Fire Departments throughout the country use the celebrated FIRESTONE SIDE-WIRE TIRES, because they wear better, and fit better than any other tire on the market—and you'll say so too if you've had any experience with other tires. *Write for particulars.*

FIRESTONE TIRE & RUBBER CO., Akron, Ohio

New York Chicago Philadelphia Boston St. Louis San Francisco Los Angeles

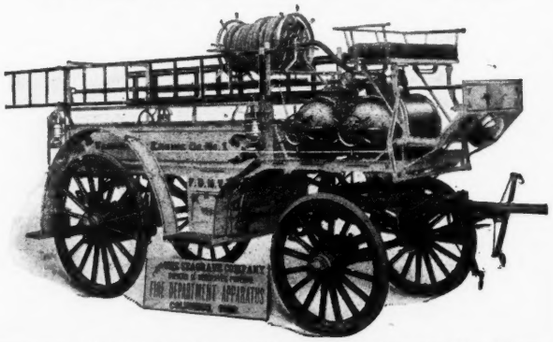
THE SEAGRAVE COMPANY

MANUFACTURERS OF

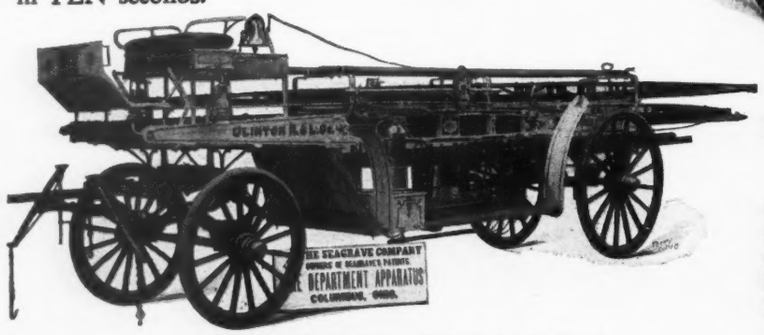
COLUMBUS, OHIO, U. S. A.

Fire Apparatus, Trussed Ladders and Equipments, Etc.

The Seagrave Company's Aerial Ladder has passed the experimental stage, and is now universally recognized as the best Aerial yet produced. It is the only ladder that can be hoisted and extended to full length by TWO men in TEN seconds.



SEAGRAVE Combination Chemical Engine and Hose Wagon.



A SEAGRAVE City Service Hook and Ladder Truck.

Not Members of any Trust.

City and Village Councils and purchasing committees are hereby cautioned that all purchasers or manufacturers of infringements on any of our Foreign and United States Patents on Trussed Ladders and Equipments are alike liable to the Patentee for damages.

"Put out a small blaze and you wont have a big one"

"Patrol" Hand Fire Extinguisher

Reliable Chemical Fire Extinguishers

SHOULD BE IN EVERY HOME AND PLACE OF BUSINESS

The Patrol hand chemical extinguisher is automatically charged by inverting, and instantly throws a fire extinguishing and FIRE REPELLING stream fifty feet from the nozzle. It has 40 times the fire extinguishing power of plain water, as it liberates harmless gases that will not support combustion. With it any one may be an efficient Fireman.

A woman or child can operate it

because it is so

SIMPLE---INSTANTANEOUS---SURE

The Patrol will last a lifetime, and can be recharged by a BOY at a cost of a few cents

"Champion" Chemical Two-Wheel Extinguisher
Capacity 40 Gallons

OUR CHAMPION two-wheel chemical extinguisher operates on the same principle, but has greater capacity and range. This is the best style for large buildings, factories and stores.

It is really a fire engine inside your premises, ready for instant use, at the time when a fire is easily put out.

Any one can operate it.

For full particulars write for our free booklet, and mention the Municipal Journal.

FOUNDED IN 1845. AMERICAN FIRE ENGINES LAFRANCE SENECA FALLS, N.Y. CINCINNATI, OHIO. ELMIRA, N.Y.

AMERICAN-LAFRANCE FIRE ENGINE CO.

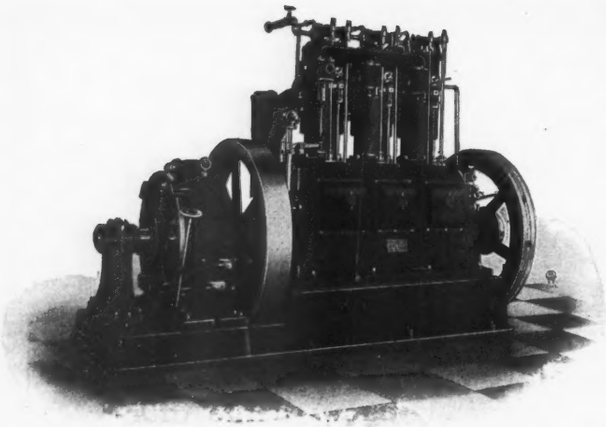
ELMIRA, N. Y.

FACTORIES:— ELMIRA SENECA FALLS CINCINNATI

BRANCHES:

NEW YORK BOSTON BALTIMORE ATLANTA CHICAGO PORTLAND ORE. SAN FRANCISCO

LEADING MAKERS OF CHEMICAL AND STEAM FIRE ENGINES



WALRATH

Gas and Gasoline Engines

FOR

Municipal Lighting and Pumping Plants

are superior to anything in the market. Made in 1, 2 or 3 Cylinders Either belted or direct connected to generators and pumps.

Marinette Gas Engine Co.

CHICAGO HEIGHTS, ILLS., U. S. A.

SEND FOR CATALOGUE "H."

THE COLE-FLAD PITOMETER

For Water Waste Detection

A Portable Recording Meter for Water Mains, attached to Any Pipe 4 to 60 inches diameter through a one-inch Corporation Cock. Accuracy established by rigid tests and years of practical use.

THE PITOMETER COMPANY, ... 220 Broadway, NEW YORK

NO LEAKY JOINTS IN UNIVERSAL PIPE

GAS

WATER

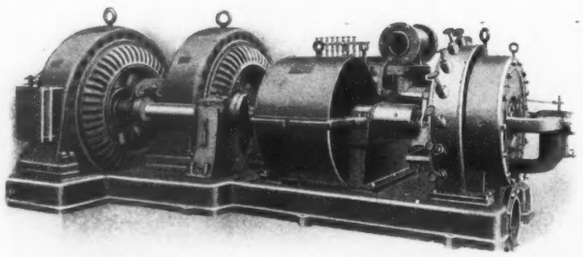
CENTRAL FOUNDRY CO. 116-N NASSAU ST., N.Y.

Contractors' Drainage Sewerage

PUMPS

Handling Dirty, Gritty and Sandy Liquids without Wear, Oil or Care. Pumping Outfits for Contractors, Mining, Irrigating, Railroad, Quarry, Drainage and Manufacturing purposes. Second-hand Engines, Boilers, Pumps and other Machinery always on hand. Exchanging.

MASLINS, - 165-167 First Street, Jersey City, N. J.



Steam Turbine Alternator, 300 H. P.

Steam Turbine Motors
Steam Turbine Dynamos
Steam Turbine Blowers
Steam Turbine Centrifugal Pumps
Electo-Motor Centrifugal Pumps

SEND FOR CATALOGUE.

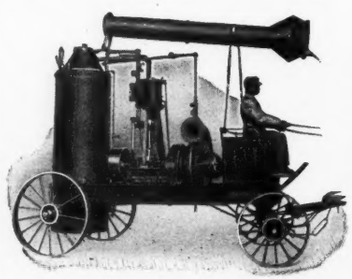
REPRESENTATIVES:

D'Olier Engineering Co., - - New York City, Philadelphia, Pa.
Chas. Garrison, - - - - - - - - Boston, Mass.
The Turbine Engineering Co., - - - New York City, Chicago, Ill
Denver Engineering Works Co., - - - - - - Denver, Col.
Florida Electric Co., - - - - - - - - Jacksonville, Florida.
Dravo, Doyle & Co., - - - - - - - - - Pittsburg, Pa.
Geo. P. Dravo, - - - - - - - - - - Milwaukee, Wis.
Chester B. Davis, - - - - - - - - - Dallas, Texas.
Joshua Hendy Machine Works, - - - - - San Francisco, Cal.
Kilbourne & Clark Co., - - - - - - - - Seattle, Wash.

DE LAVAL STEAM TURBINE COMPANY

Works and Sales Offices, TRENTON, N. J.

PUMPS FOR SEWAGE AND GARBAGE DISPOSAL



Mounted Centrifugal Pumps

for pumping out flooded cellars, etc.

Morris Machine Wks.

BALDWINSVILLE, N. Y.

NEW YORK OFFICE

39-41 CORTLANDT STREET.

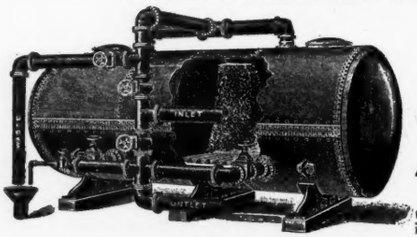
HENION & HUBBELL, AGENTS

150 North Jefferson St., Chicago, Ill

Jackson Filter Mfg. Co., CHEMICAL BUILDING ST. LOUIS, - MO.

FILTRATION AND PURIFICATION OF WATER

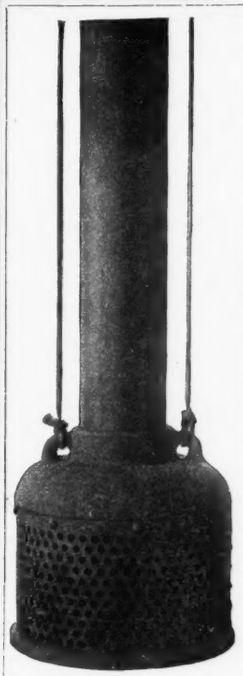
Awarded Two Gold Medals at World's Fair



FOR CITIES
Public Buildings
Private Residences
Paper and Textile Mills
And All Other Purposes

We manufactute more filters than any two companies in the United States.

Our Filters are Installed in Fifteen Cities in the Southwest



Strainer Lowered in position

For Use With Any Kind of Pump or Intake

The Emerson Quick Cleaning Strainers and Foot Valves

In pumping from streams or lakes, where the water always contains more or less refuse, they are indispensable.

It is something you have wished for often when you have been compelled to shut off your water supply to clean up or dig out a clogged strainer of some other pattern. The EMERSON Quick Cleaning Strainer can be raised, cleaned and lowered in position again in *less than one minute by the watch,* thus insuring a full and clear opening for the flow of water into the intake at all times, without delay or annoyance, which cannot be done where any other device is used.

Our Foot-Valves are simpler and embody more advantages than any other valve on the market. We also make the Emerson Steam Pump, "best of its class." All "Emerson" products rank first in their line. *Send for Proof.*

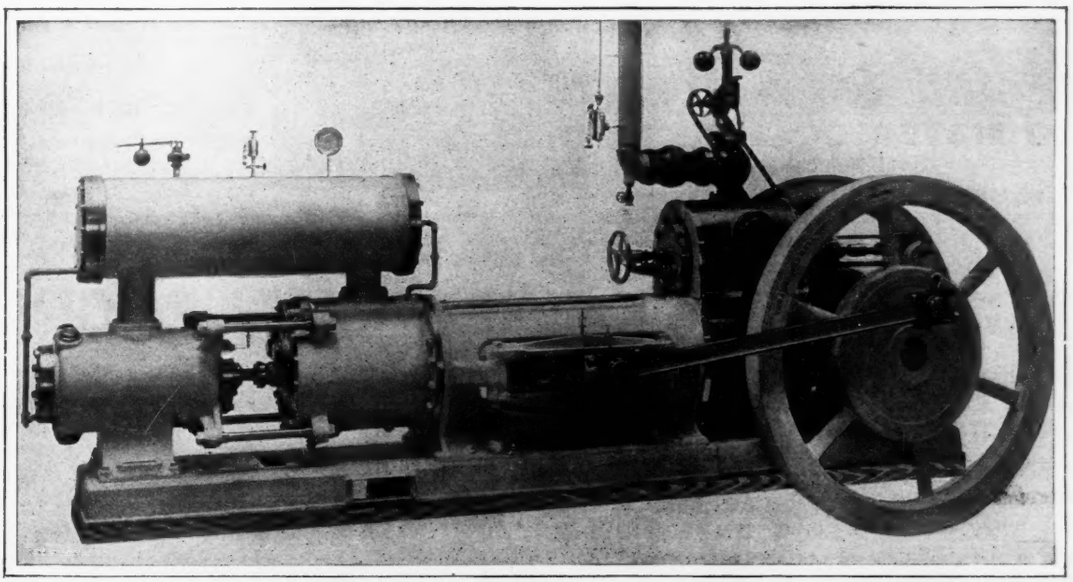
Strainer Partially Raised for Cleanig

Emerson Steam Pump Company

Office and Works **Alexandria, Va., U S. A.**

Chapman's Compressed Air Water Lift System

Best For Municipal Water Works Pumping



THE MACHINE IS ESPECIALLY BUILT FOR THIS CLASS OF WORK

CORRESPONDENCE, WITH SPECIFICATIONS, SOLICITED FROM INTERESTED PARTIES

THE AMERICAN WELL WORKS

AURORA, ILLINOIS, U. S. A.

CHICAGO, ILLINOIS, 45 W. RANDOLPH ST. NEW YORK CITY, 2 AND 4 STONE ST. DALLAS, TEXAS

Successful Management

OF A WATER WORKS PLANT IMPLIES THE USE OF

KEYSTONE WATER METERS

LET US PUT YOU ON THE HIGH-ROAD TO SUCCESS BY COMPLETELY EQUIPPING YOUR PLANT WITH METERS.

PITTSBURG METER COMPANY

EAST PITTSBURG, PA.

UNION WATER METER COMPANY,

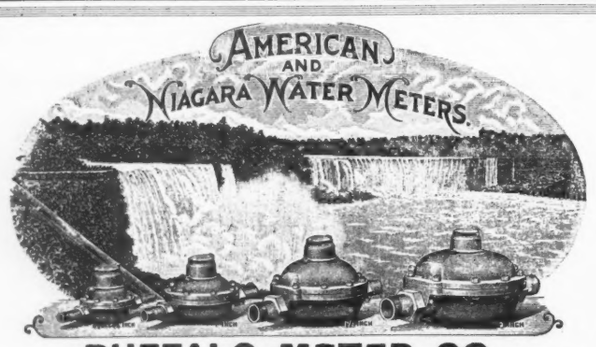
WORCESTER, MASS.

MANUFACTURERS OF **WATER METERS**

RECIPROCATING PISTON, ROTATING PISTON AND DISC PATTERNS.

Also Steam Fire Alarm Gongs, Chronometer Governor Valves, Corporations, Curb and Waste Stops, etc., etc.

SEND FOR CIRCULAR AND PRICE LISTS.



BUFFALO METER CO.,

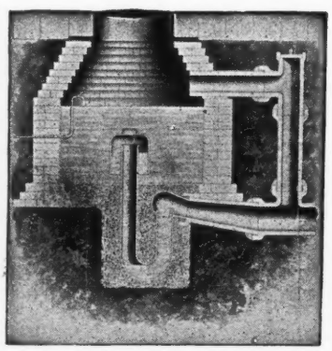
290 TERRACE, BUFFALO, N. Y.

Over 60,000 in Use.

MILLER AUTOMATIC SIPHON

FOR

Intermittent Flush Tanks



For Flushing Street Sewers and for Sub-Soil Irrigation.

No Moving Parts. No Valves. No Small Tubes to Clog or Choke Nothing Whatever to Get Out of Order.

Pacific Flush Tank Co.

THE TEMPLE, 184 La Salle St., CHICAGO

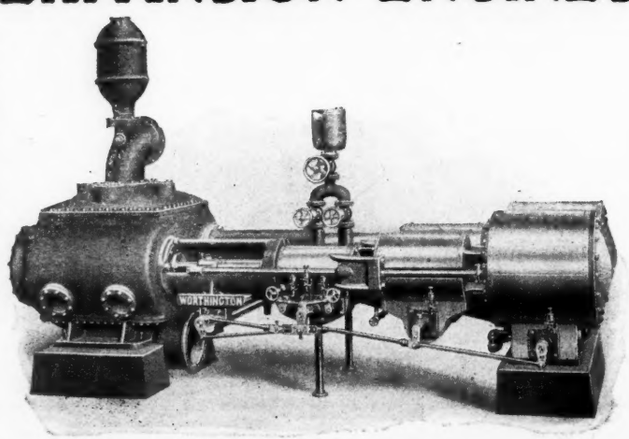
Eastern Agency, 42 Broadway, N. Y.

OFFICIAL TESTS OF TWO STANDARD

WORTHINGTON TRIPLE EXPANSION ENGINES

without high duty attachment, installed at the Brooklyn Water Works, Milburn, L. I., show results never before approached by engines of this type. Sixty-five years of progressive development are embodied in the design. The Semi-rotary Valves insure economical distribution of steam. Cylinders and reheaters are jacketed with steam at boiler pressure. All heads may be taken off, and simplicity of construction renders all interior mechanism easy of access.

For Water Works service in moderate sized plants.
Send for catalogue W 30 ML.



Henry R. Worthington

114 LIBERTY STREET, : : NEW YORK

CONTRACT NEWS FOR THE MONTH

Including Paving, Sewerage, Water Supply, Lighting (Public Buildings), Sewage and Garbage Disposal, Contracts Awarded

N. B.—All news of proposed work sent us by city officials is incorporated in our Weekly Advance News Service and appears subsequently in this "Contract News for the Month" if the date of the reception of bids be sufficiently late to warrant placing the item here.

City officials and others are urged to send us all news of contemplated improvements for use in our Weekly Bulletins which are mailed to those interested.

PAVING, PAVING MATERIALS AND MACHINERY

Alameda, Cal.—Will re-grade, macadamize and lay concrete curbs on Alameda avenue and Paru street. City clerk.

Albany, N. Y.—May pave Bassett street and may pave Mulberry street and Lake avenue with vitrified brick.

Alliance, O.—May pave Oxford and South Webb streets. Will pave Cambridge street with asphalt.

Amsterdam, N. Y.—Wants bids June 6th for paving Chuctonunda street with fire-clay block, estimated at 1,200 square yards and cost at $3,000. F. E. Crane, city engineer.

Auburn, N. Y.—Will have plans and specifications prepared for paving Ross place and West Genesee street. Will pave this year Garden, Green, Clark and Water streets.

Augusta, Me.—Will macadamize several city streets and one mile of suburban streets. W. B. Getchell, city engineer.

Baltimore, Md.—Recently voted to issue $1,000,000 bonds to inaugurate a chain of parks and boulevards. $500,000 is also available for paving, grading, curbing, etc., in the burned-out district, $250,000 for improved pavements and sewers this year and $250,000 for the development of Wyman's Park and for the construction of Merryman's boulevard. Mosher and Patuxent streets will be paved. $2,000,000 bonds were voted for the development of the annex. Mayor Timanus.

Bellingham, Wash.—Will call for bids for asphalting Elk street: $30,000.

Binghamton, N. Y.—Is having plans and specifications prepared for brick pavement on Court street.

Bloomfield, Ind.—County Commissioners want bids June 6th for gravel and macadam roads in Cass, Grant and Stafford townships.

Bloomington, Ill.—Passed ordinance to pave Lee and Oak streets with brick. Elmer Folsom, city engineer.

Boise, Idaho.—May construct large amount of curbing, paving and cement walks.

Browntown, Ind.—H. W. Wacker, auditor of Jackson County, wants bids June 6th for four miles of gravel or macadam roads.

Cairo, Ill.—Is having estimates made for several miles of brick paving.

Calumet, Mich.—Will sell at once $75,000 bonds for street improvements.

Central City, W. Va.—Voted to issue $29,000 bonds for paving. D. W. Frampton, city clerk.

Chicago, Ill.—Has adopted plans for paving Sacramento avenue with asphalt roadway and concrete walks: $145,821.

Columbus, O.—Will improve and repair Locust and other streets and Neil and Dennison avenues. City clerk.

Corydon, Ind.—Harrison County will soon want bids for 43,237 feet of gravel road construction. F. E. Watson, auditor.

Denver, Colo.—May pave Blake street with Belgian blocks: $8,000. Has approved and adopted specifications for paving Welton street with asphalt: $49,066. Board of Public Works.

Donaldsonville, La.—Voted to issue bonds for street improvements. G. H. Richard, mayor.

Dunkirk, N. Y.—May lay 10,000 square yards of brick pavement. J. P. Morrissey, city engineer.

Elmira, N. Y.—Will pave Clinton street. F. Leach, city engineer.

Elyria, O.—Will pave Eighth street with brick or sheet asphalt. F. R. Fauver, clerk.

Enid, Okla.—Will pave five and one-half blocks on Broadway and other paving is contemplated.

Erie, Pa.—Will pave Ash street.

Evansville, Ind.—Will soon want bids for paving Sixth street with brick. Board of Public Works.

Findlay, O.—Will pave Tiffin avenue: $19,000. Will pave Carnahan avenue with vitrified block and bonds for same will be issued. City auditor.

Fremont, O.—Will curb and pave West State street. City auditor.

Gadsden, Ala.—Will vote June 5th on issuance of $40,000 bonds for paving.

Greencastle, Ind.—County will want bids for one and one-half miles of gravel road construction in Marion township. County clerk.

Hagerstown, Md.—Will pave three streets with vitrified brick. J. O. Beard, city clerk.

Haverhill, Mass.—The $20,000 recently authorized for street improvements has been allotted to the various wards and the work will commence at once.

Jackson, Tenn.—County will issue $150,000 additional road bonds. County clerk.

Jacksonville, Fla.—Board of Trade will have a report made on the advisability of bonding the city for paving and other purposes.

Jersey City, N. J.—Will asphalt Newark avenue: $36,000. Hudson City Business Men's Association wants Central avenue and Franklin street repaved and $17,520 may be appropriated for the purpose. Bergen street will be asphalted.

Kankakee, Ill.—May pave alleys with brick: estimated at 8,000 square yards. Board of Local Improvements.

Kansas City, Mo.—Clerk of Wyandotte County wants bids for grading and macadamizing Pard road: $8,000.

La Crosse, Wis.—Voted to issue $15,000 street improvement bonds.

Little Rock, Ark.—Will probably construct fifteen miles of cement walks this year.

Lockhart, Tex.—Caldwell County has issued $15,000 bonds for road improvements.

London, Ont.—Will lay vitrified brick pavement on Talbot street and construct cement walks.

Los Angeles, Cal.—Will pave Central avenue. H. T. Stafford, city engineer.

Louisville, Ky.—Mayor approved ordinance for asphalting Frankfort avenue: $30,000. Will pave Shelvin street with vitrified brick.

Lowell, Mass.—Passed ordinance appropriating $16,500 for paving Chelmsford street.

Mahanoy, Pa.—Will issue $35,000 bonds for paving.

Marietta, O.—Will construct a large number of sidewalks.

Masillon, O.—Will issue $55,000 bonds or paving.

Mayfield, Ky.—May issue street bonds.

Meadville, Pa.—May pave Park avenue: 13,000 square yards of brick and 8,000 square yards of asphalt. W. A. Doane, city engineer.

Memphis, Tenn.—Will asphalt Main street: $40,300.

Milwaukee, Wis.—May resurface with asphalt on Wisconsin street. Charles Poetsch, city engineer.

Mt. Clemens, Mich.—Has petitioned Legislature for permission to issue paving bonds.

Montreal, Que.—Road Committee will spend $156,000 for repairs to pavements; $50,000 for half costs of permanent sidewalks; $20,000 for macadamizing streets which were widened last year; $50,000 for grading and macadamizing new streets and $100,000 for new permanent pavements.

Nashua, N. H.—May pave Main street with granite blocks on concrete base: about 4,000 square yards.

Nashville, Tenn.—Has been authorized to issue the bonds voted at the election last November, of which $500,000 will be expended for improving the unimproved streets within the city limits and $200,000 for extending Commerce street.

Newark, N. J.—Has $400,000 for street paving this year and $175,000 of this sum has been planned or ordered. May pave Grafton avenue with granite blocks, Third avenue with brick and South Eleventh street with brick or asphalt.

New Orleans, La.—May pave Opelousas avenue and may repave St. Charles street with asphalt. Wants bids June 16th for erection of an asphalt repair plant. Will want bids for paving Baronne and Prytania streets. Will pave Lafayette street with asphalt and pave Robert, Carondelet and Valmont streets. May pave St. Roch, Howard and Cleveland avenues and Iberville street. Will want bids for repair of Saratoga street and all brick pavements. Charles R. Kennedy, city comptroller.

Oxford, N. Y.—Has secured engineer to prepare specifications for a macadam road.

Portage la Prairie, Man.—Will pave the main streets with granolithic.

Racine, Wis.—County will soon vote on a bond issue for macadamizing and improving sixteen miles of roads: $98,894. T. H. Knight, county surveyor.

Redlands, Cal.—Will asphalt Cajon street.

Rockingham, N. C.—Richmond County voted to issue $25,000 bonds for road construction purposes. County clerk.

St. Boniface, Man.—Town engineer, Cecil Goddard, has submitted report on asphalting streets which calls for an expenditure of $287,000.

St. Paul, Minn.—May macadamize Arcade, Rice, State, South Robert and Minnehaha streets, Point Douglas road, Cherokee and Cleveland avenues, aggregating about sixteen miles and estimated at $35,000.

Salisbury, Md.—May lay from 5,000 to 9,000 square yards of brick pavement.

San Francisco, Cal.—Asphalt pavement has been recommended for Valencia street: $58,827.

San Luis Obispo, Cal.—Residents of eastern part of city are petitioning for an election to vote on $100,000 bond issue for a macadam county road and a public wharf.

Spangler, Pa.—Voted to issue $10,000 street improvement bonds. City clerk.

Springfield, Ill.—May pave North Second street with brick. Frank Hamilton, city engineer.

Steelton, Pa.—Passed ordinance for paving Front street.

Sullivan, Ind.—County treasurer, A. V. Minich, will sell $152,138 gravel road bonds.

Syracuse, N. Y.—Will pave South State street with asphalt and Tully street with brick.

Tacoma, Wash.—Rejected all bids for paving K street with asphalt and will call for new ones. Lowest was $37,380.

Tampa, Fla.—Will have profiles made for street improvements. City clerk.

Toledo, O.—Will pave Chicago and Horton streets and Walbridge avenue intersections. Will pave Ewing street and Whitney avenue.

Tonawanda, N. Y.—Will macadamize several streets. Board of Public Works.

Troy, N. Y.—Will pave North First street with brick. City clerk.

Vancouver, B. C.—Will expend $500,000 on permanent improvements to streets and roads. A. E. McEvay, city clerk.

Victoria, B. C.—Will pave Johnston street with wooden blocks: $23,000. City clerk.

Viedersburg, Ind.—Will soon call for bids for street improvements

ENGINEERS, CONTRACTORS, Etc.

ENGAGED IN MUNICIPAL WORK

IOWA ENGINEERING CO.,
CONSULTING CIVIL ENGINEERS,
WATERWORKS, SEWERAGE & MUNICIPAL EXPERTS
410-11-12 WESTON BLOCK, CLINTON, IOWA
CHAS. P. CHASE, PRES. & MGR. ARTHUR J. COX, SEC. & TREAS.

Emil Kuichling, C. E.
CONSULTING ENGINEER
52 Broadway, NEW YORK
Member of Am. S. C. E.
Plans for Public Water Supplies, Steam and Hydraulic Powers and Electric Power Transmissions.

CITY-WASTES DISPOSAL CO.
156 Fifth Avenue
NEW YORK
(Organized from the Staff of the late Col. George E. Waring, Jr.)
Consulting and Contracting in Sewerage, Sewage Disposal, Garbage and Refuse Disposal and Street Cleaning.

WISE & WATSON
CIVIL AND CONSULTING ENGINEERS
Passaic National Bank Building
PASSAIC, N. J.
COLIN R. WISE, City Surveyor of Passaic, N. J.
ROBERT M. WATSON, Borough Engineer of Rutherford, N. J.

J. T. FANNING
CONSULTING ENGINEER
300 Hennepin Avenue
MINNEAPOLIS, MINN.
M. Am. Soc. C. E.
Plans for Public Water Supplies, Steam and Hydraulic Powers and Electric Power Transmissions.

CHARLES A. HAGUE
Municipal Engineering a Specialty
HYDRAULIC CONSULTING ENGINEER
52 BROADWAY
NEW YORK CITY
MEMBER
Am. Soc. Civil Engineers
Am. Soc. Mechanical Engineers
CABLE ADDRESS
"GAUDA"
TELEPHONE CONNECTION

PAUL WILKES
ARCHITECT
AND
CONSULTING ENGINEER
24 Wick Block
CLEVELAND, - - - OHIO
Specialty, designing Plans for **Artificial-Stone** and **Hollow-Block-Buildings, Reinforced-Concrete-Construction** for all buildings **Advise** in **Manufacturing** all kinds of **Artificial Stones**, etc. **Cement Machinery**, etc., etc.

Rudolph Hering
AND
George W. Fuller
HYDRAULIC ENGINEERS AND SANITARY EXPERTS
170 Broadway, NEW YORK
Water Supply, Water Purification, Water-Power, Sewerage and Sewage Disposal. Examinations of Projects, Plans, Specifications and Estimates of Cost.
Construction Superintended

Westmount (Suburb of Montreal), Que.—Will raise $250,000 for construction of roads, sidewalks and drains for the next five years. Mayor Duclos.

Woonsocket, R. I.—Will pave Main and Cumberland streets: $30,000.

Wyandotte, Mich.—Residents of Biddle street have petitioned for it to be paved.

Zanesville, O.—Will let contract in June for 2,345 yards of brick paving and 1,340 linear feet of concrete curb. E. H. Smith, city engineer.

CONTRACTS AWARDED

Cincinnati, O.—Contract resurfacing Race street with asphalt let to Kirchner Construction Co., $11,830.

Columbus, O.—Contract for constructing macadam road along Scioto dam let to Buckeye Engineering and Construction Co., $24,287.50.

East St. Louis, Ill.—Contract paving Second street with brick let to M. J. Keeley, city, $24,321.

Janesville, Wis.—Awarded contract for brick pavement on South Main street and East and West Milwaukee streets, Elzy and Dunn, Marshalltown, Ia., $30,706.

Logansport, Ind.—Contract for road between Howard and Cass Counties let to Daniel M. Tulley at $17,500.

Mankato, Minn.—Contract for paving with Purington blocks on Front and Jackson streets, Fielding and Shepley, St. Paul, Minn., at $40,946 and $10,160 respectively.

Newark, N. J.—The following contracts for paving with granite blocks were let to William C. Shanley: New Jersey Railroad avenue, $32,697; Ferry street, $31,632; Parkhurst street, $4,014; Mulberry street, $15,352, and Sixteenth avenue, $30,962.

New York, Borough of Brooklyn, N. Y.—Contracts for paving with granite on concrete base were awarded as follows: Twentieth street and Willoughby avenue, to Bermuda Alcatraz Co., Twelfth street and Gowanus Canal, at $34,733 and $47,777 respectively; Furman street, James Quinn, Sr., 1481 Avenue A, New York, at $34,040. Contracts for paving with asphalt on concrete base were let as follows: Hart street, Cranford Co., 52 Ninth street, Brooklyn, $31,545; Evergreen avenue, Uvalde Asphalt Paving Co., 1 Broadway, New York, $13,857.

Oakland, Cal.—Contract for building the Mocho road let to W. J. Schmidt, Berkeley, Cal., $49,500.

Plainfield, Ind.—Contract for one and one-half miles of cement sidewalks was awarded to Ferguson, Matthews and Co., Indianapolis, Ind.

Rensselaer, Ind.—Contract for Gillam township gravel roads let to Glidenville and Son, Greenville, Ind., $19,170.

St. Paul, Minn.—Contract for St. Paul, White Bear and Bald Eagle road reported let to W. J. Prendergast, city, at $211,478.

Salt Lake City, Utah.—Contract for cement walks for 1905 was awarded to Utah Fireproofing Co., $29,230.

Seattle, Wash.—Contract for paving Olympic place was let to Sparger Concrete Co., city, at $14,575.

SEWERS.

Abbeville, La.—Voted to issue bonds for sewerage system. The mayor.

Asbury Park, N. J.—Voted to issue bonds for sewer system.

Augusta, Me.—Will construct one-half mile of sewer with outlet.

Baltimore, Md.—Voted to issue $2,000,000 bonds for the development of the Annex. Voted to issue $10,000,000 bonds for sewers. Mayor Tomanus.

Biloxi, Miss.—Will want bids soon for $30,000 sewer system. City clerk.

Blackwell, Okla.—Has adopted plans for sanitary sewer system.

Bolinos, Cal.—Voted to issue bonds for a sewerage system.

Brookside, W. Va.—May issue sewer bonds.

Cairo, Ill.—Is having estimates made for intercepting outlet sewer, two miles long.

Cincinnati, O.—Has plans for sewer in Torrence road, East End: $33,141.

Hudson Engineering & Contracting Co.
92 William Street, New York
Branch Office
518 Walnut St., Cincinnati, Ohio
Bacon Patent Simple and Compound Air Lift Systems for Pumping from Wells and Surface Sources.
Water Works and Artesian Well Systems Designed and Installed.

JAMES M. CAIRD
Assoc. Am. Soc. C. E.
Chemist and Bacteriologist
Office and Laboratory:
271 River Street, Troy, N. Y.
Water Analysis and Tests of Filter Plants

JOHN W. ALVORD
MEM. AM. SOC. C. E.
CONSULTING ENGINEER
1207 Hartford Bldg., CHICAGO
Hydraulics and Sanitation Works. Water Supplies, Water Power, Sewerage, Sewage Disposal.

STEPHEN CHILD
LANDSCAPE ARCHITECT
AND
CONSULTING ENGINEER
Warren Building, 2a Park St.
BOSTON, MASS.
S. B. Massachusetts Institute of Technology, 1888.
Member American Society of Civil Engineers.
Telephone Connection
Correspondence Solicited.

O. H. SHEFFIELD & CO.
CIVIL ENGINEERS AND ARCHITECTS
518 Austell Building, ATLANTA, GA.
Railways
Water-Powers
Municipal Public Works
Bridges and Buildings

BROSSMANN & KING
CONSULTING ENGINEERS
619-622 Lemcke Building
INDIANAPOLIS
Water Supply
Filtration Systems
Sewerage and Sewage Disposal

WILLIAM B. EWING
CIVIL AND CONSULTING ENGINEER
1003 Chamber of Commerce
CHICAGO, ILL.
MEM. AM. S. C. E. MEM. WEST. S. E.
For Hydraulic, Sanitary, and Municipal Works. Water Works, Sewerage Systems, Septic Tanks, Sewerage Purification. Water Power, Pavements, Bridges, Expert Concrete Construction, Expert Examinations and Reports.

W. H. SCHOTT
ENGINEER
Marquette Building
CHICAGO
Designer and Builder
CENTRAL STATION
HEATING, GAS,
ELECTRIC LIGHT
and POWER PLANTS
STREET RAILWAYS FINANCED AND BUILT COMPLETE

J. W. HOWARD, C. E., E. M.
Consulting Engineer
1 BROADWAY, NEW YORK
Expert on Street Construction and Pavements of all kinds, Including Asphalt and Bitulithic
Reports, Advises, in person or by mail on Specifications, Formulæ, Chemical Analyses, Physical Tests of Materials of Existing and Proposed Pavements. Old and New Patents of America and Europe affecting Pavements. Paving Litigation prepared with Expert Testimony. Twenty-Four Years' Experience. Best References from Cities, etc.

We Lease Trench Excavators

TO BUY OR TO LEASE?

Which is Better for Contractors Using

HEAVY MACHINERY FOR HEAVY WORK

The Following Reasons Prove that for this Class of Work it is Better to Lease than to Buy

DESIGN

History shows that all machinery is more or less defective in design. In actual use improvements are suggested and *unless the purchaser can afford to continually discard partly worn machines* he falls behind the procession.

CONSTRUCTION

The purchaser has to stand all expense of faulty construction caused by oversight, carelessness or incompetency of manufacturers or employees.

Perhaps there is no department of commerce where more mistakes occur which customers have to pay for.

MATERIAL

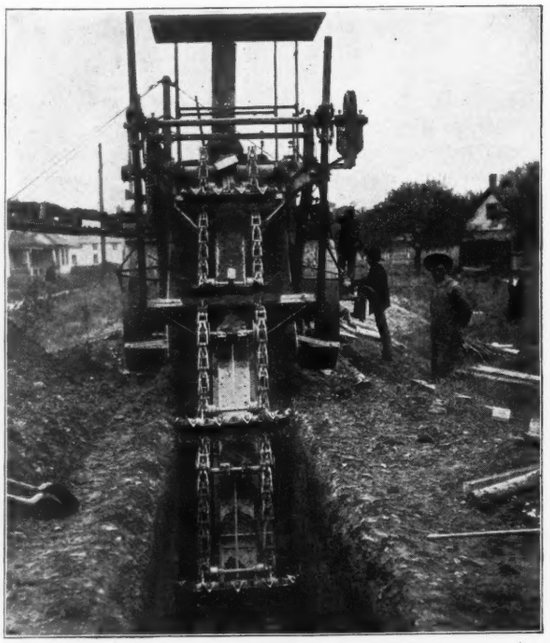
The evolution of machinery not only calls for changes in design and construction but also for changes in material, such as substitution of steel for iron, and manganese for steel, etc. This, added to the failure of mills to always supply material free from fractures or faults, failure to supply material in accordance with specifications calling for chemical tests, etc., are all factors which the purchaser practically *assumes* at his own risk unless minimized by the fact of purchasing from a manufacturer of HIGH COMMERCIAL STANDING AND LONG EXPERIENCE.

PATENT LITIGATION

Until passed upon by Court of last resort, few machines calling for large expenditure of money are immune from liability to patent complications. The patentee, manufacturer and purchaser are all liable.

THE CONTRACTOR

who leases machinery has no capital tied up in a machine he cannot use every day in the year. He leases UP-TO-DATE MACHINES and *the parties owning the machine assume responsibility* for design and changes.



We Lease the Only Practical Trench Machine

We assume all responsibility for design, construction and materials.

We furnish expert operators so *contractor has no liability* for personal injury to operator.

Contractors do not pay for renewals and repairs (occasionally a large and annoying item).

Ample stock of extras and repairs go with each machine and *delays from this cause are reduced to a minimum.*

THE MAN WHO LEASES

regulates his expenses according to his work and

HAS NO WORN-OUT MACHINERY

a total loss on his hands.

AN INCREASE OF CAPITAL

The contractor who leases is able to obtain results otherwise obtainable only by an increase of capital. To escape the penalty attaching to a lapse of time limit *he can lease several machines* and expedite work. This is a large factor counting for success.

Trench Work is Hard on Machinery

and *the life of a trenching machine is comparatively short* for it is subjected to many shocks and much abuse from varying conditions of work and material encountered.

SIZES

THE CHICAGO SEWER EXCAVATOR is made in five sizes, excavating trenches any depth, to twenty feet at one cut *with widths varying from 14 inches to 60 inches,* with vertical sides. We also make machines cutting ditches with sloping banks.

WORK DONE

We have many records of over 600 cubic yards excavated in ten hours.

NO EXPERIMENT

The success met with in using these machines, *especially with the large number in service the past season,* together with the improvements being made warrant us in saying that the 1905 machines are perfect. *We know the contractors who used them in 1904 made money.*

WE TAKE THE RISK

WHY DIG BY HAND WITH THE ATTENDANT ANNOYANCE, UNCERTAINTY AND EXPENSE?

We are the original manufacturers of the most practical and successful trench machine of the wheel type.
We sell this machine to contractors who **PREFER TO OWN** than lease.

Municipal Engineering and Contracting Company

Send for Circular No. 137.

RAILWAY EXCHANGE, CHICAGO, U. S. A.

We Lease Trench Excavators

Hand Digging is Out of Date for Trenches

The Chicago Sewer Excavator is the only practical machine for excavating Trenches for Sewers, Waterpipes and all Conduits.

THESE MACHINES SAVE TIME, MONEY AND WORRY

ESTIMATING

When estimating on trench work a contractor has hard work figuring on the labor question.

Our Chicago Sewer Excavator saves him on the following uncertain points:

ACCIDENTS

Another contractor says:

"My accident insurance is less than before because I employ only five per cent. the number of men.

"Accidents are less likely to happen also when so few men are employed."

DEEP WORK

By hand the cost increases rapidly with depth.

Complicated with hard pan the cost of hand work frequently proves ruinous.

With the machine the cost increases very slightly with depth. It all comes with one cut.

Scarcity of Labor

One user writes:

"This machine does the work of 150 men."

As labor is often scarce, especially in small places, the above statement has weight.

A Good Foreman

Another user says:

"The machine is a pacemaker. My pipe layers make records they believed impossible before they had to keep up with the digger."

According to this man he does not need a foreman to crowd the men.

Each man does a day's work impossible under old conditions.

TIME LIMIT

A time limit has no terrors. Figuring work is a matter of simple addition.

If one machine is not enough, get two or more. They are leased, not bought, *so a small amount of cash is required to double or treble working capital.*

ALWAYS ON HAND

A contractor writes:

"The digger is on hand the day after pay day in good condition. It works overtime and never loafs.

"When extra work is called for I find it easier to deal with two or three men and the machine than to talk with 150 men who want all there is in it."

TOUGH GROUND

The machine does the best work in ground that ordinarily requires the use of picks.

If surface indications show easy digging or borings made in the ground were in the wrong place a contractor loses when he estimates on hand work based on such evidence.

By using hand labor he faces a serious condition; but by using the machine he is safe.

MORE WORK

A contractor can do several jobs with fewer men than ordinarily employed on one job.

A contractor writes:

"I used two of your machines for three months and dug 15 miles of trench varying from 8 to 16 feet in depth, mostly in hard pan."

THINK IT OVER

Municipal Engineering and Contracting Company

Send for Catalog No. 137.

RAILWAY EXCHANGE, CHICAGO, ILL.

We appreciate it as a personal favor when inquirers mention paper in which they read our advertisement.

Des Moines, Ia.—Appropriated $17,000 for the Ingersoll sewer.

Detroit, Mich.—Plans have been completed by Mason L. Brown, engineer, Detroit, for sewer system for Ford village: $50,000. Fairview Common Council passed resolution to appropriate $20,000 towards joint sewer with Detroit.

Dunkirk, N. Y.—May construct seven and one-half miles of sewers this year. Jas. P. Morrissey, city engineer.

East St. Louis, Ill.—Will soon want bids for a $75,000 sewerage system. W. J. Crocken, city engineer.

East Syracuse, N. Y.—Voted to issue $25,000 bonds for completion of village sewer system.

Elyria, O.—Has completed plans for sewer system.

Ford, Mich.—May issue $50,000 bonds for sewers.

Ft. Worth, Tex.—Will want bids in about three months for $70,000 worth of sewer construction. J. B. Hawley, city engineer.

Franklin, Ind.—May construct $50,000 sewer system. Otis B. Sellers, city engineer.

Gadsden, Ala.—Is having plans prepared by Julian Kendrick, city engineer of Birmingham, Ala., for a sewer system and will vote on $60,000 for same June 5th.

Galesburg, Ill.—Preliminary plans are completed for complete sewer and sewage purification system for this city: $528,000. M. Connelly, city engineer.

Grand Rapids, Mich.—Has prepared plans for sewer to Soldiers' Home: $10,000.

Greensburg, Ind.—Is having plans prepared and will soon want bids for complete new sewer system. City clerk.

Haverhill, Mass.—May issue $10,000 bonds for new sewer. R. R. Evans, city engineer.

Hoboken, N. J.—Sewerage Committee is considering a $300,000 sewerage system and pumping station.

Huntington, Ind.—Will want bids soon for 6,000 feet of 28-inch by 48-inch (diameter) vitrified brick sewers. H. H. Wagoner, city engineer.

Ironton, O.—Will issue $10,000 sewer bonds.

Jacksonville, Fla.—Report is to be made to Board of Trade on question of bonding city for sewerage construction and other purposes.

Littleton, N. H.—Voted to issue $7,000 bonds for sewer system. Town clerk.

Lockport, N. Y.—Will sewer Allen and Nichols streets. E. S. Bennett, city clerk.

Los Angeles, Cal.—May issue $250,000 additional bonds for completion of outfall sewer. H. T. Stafford, city engineer.

McMechen, W. Va.—May install sewers. City clerk.

Manistique, Mich.—Wants bids for constructing $200,000 sewer system.

Marietta, O.—Will lay sanitary sewer in Fifth Sewer District. City auditor.

Marion, Mass.—Has had report made on advisability of installing sewage disposal plant. Town clerk.

Meridian, Miss.—Will construct a $35,000 sewer system. The mayor.

Milwaukee, Wis.—Will construct twenty-six sewers on West Side, twenty sewers on the South Side and two on the East Side, some of which are of brick: $200,000. City engineer is Charles G. Poetsch.

Moline, Ill.—May construct a sewerage system in Fifth ward: $45,000.

Mt. Clemens, Mich.—Has petitioned Legislature for permission to issue bonds for sewers. City clerk.

Muskogee, I. T.—Will vote on $100,000 bond issue for extension of sewer system and water mains. City clerk.

Neenah, Wis.—Will sewer on First, Second, and Fifth streets. E. W. Thurston, city engineer.

Norristown, Pa.—A resolution has been introduced which provides for construction of twenty-nine miles of sanitary sewers. S. C. Corson, borough engineer.

Northampton, Mass.—Sewer Commissioners have asked for $100,000 for extension of main sewer to Connecticut River.

Sewer Construction AND **PIPE LAYING TOOLS** A SPECIALTY

Write for Catalog
J. G. POLLARD
141 Raymond Street
BROOKLYN, N. Y.

W. R. CONARD
Inspector of Iron Castings
Including: Building, Bridge and Sewer Castings, Valves and Hydrants.
Specialty: Water and Gas Pipe and Specials for same.
1004 High Street, Burlington, N. J.

CARSON TRENCH MACHINE CO.
BOSTON, U. S. A.
Forty cities save money and keep their streets open by using our Trench Machines on their sewer jobs. Send for Catalogue. Correspondence from contractors invited.
OFFICES: 10 Barclay Street, New York; 22 South Water Street, Cleveland

Davison Foundry Company
103-109 W. Monroe Street, Chicago, Ill.
Branch, Maywood, Ill.
MANHOLES AND CATCHBASINS
Curbs and Covers for cities, towns and villages. Covers for telephone and electric light conduits. Also manufacturers of power transmission machinery.

THOMAS HAWKES
LANDSCAPE ARCHITECT
1532 Monadnock Block
CHICAGO
Designs Prepared for Parks, Cemeteries, Private Estates, Subdivisions, &c.
Correspondence Solicited
Tel., Harrison 3652

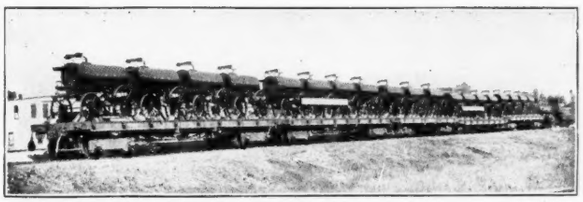
GEORGE B. BASSETT
Mem. Am. Soc. C. E.
CIVIL AND HYDRAULIC ENGINEER
290 Terrace, BUFFALO, N. Y.

***The* CUTLER MAILING SYSTEM**
Patented—Authorized by P. O. D.
U. S. MAIL CHUTE
Installed in connection with the U. S. Free Collection Service, in Public Buildings of all kinds, only by the Sole Makers
THE CUTLER MFG. CO., Rochester, N. Y.

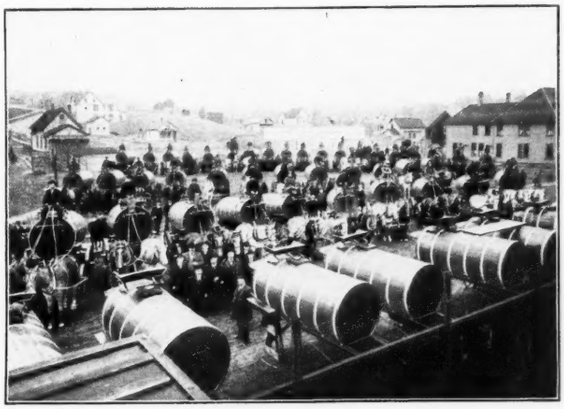
LEWIS & KITCHEN
ENGINEERS AND CONTRACTORS
for the Designing and Construction of
Septic Tanks **Garbage Crematories**
Sewage Disposal Works
— ADDRESS —
901 Broadway, Kansas City, Mo. 433 Wabash Ave., Chicago, Ill.

For Table of Contents
See Page 9
For Index to Advertisers
See Page 7
For Business Directory
See Pages 11 and 13

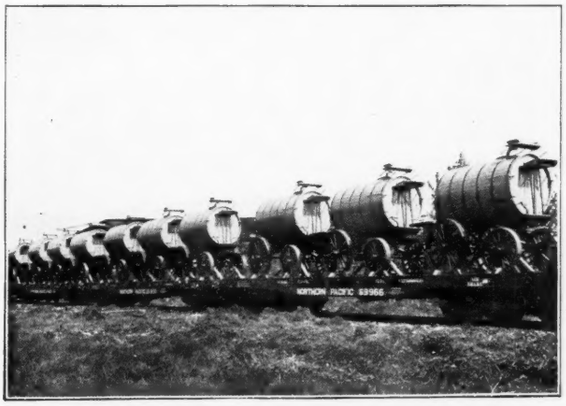
TRAIN-LOADS OF AUSTIN SPRINKLERS



Train-load of Austin Sprinklers for the Parks of Greater New York.



Train-load of Austin Sprinklers purchased by the City of St. Paul, the largest single shipment of Sprinklers ever made by any one company.



Train-load of Austin Sprinklers purchased by the United States Government, for use in Yellowstone Park.

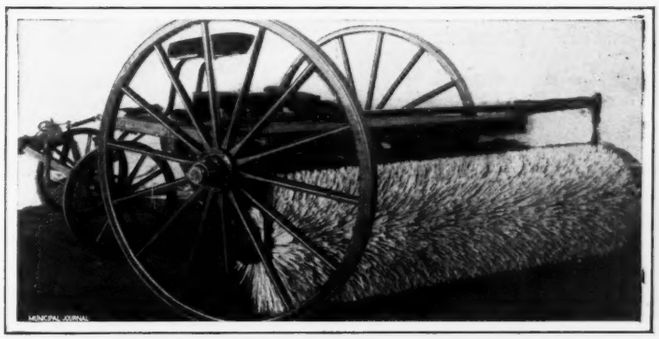
A few years ago we were selling **Austin Sprinklers** by car-loads. Now they go out by **Train-loads.**

Some of these train-load purchasers are: **The United States Government,** for use in the **City of Washington,** the cleanest city in America, which is swept and sprinkled by **Austin Sweepers and Sprinklers;** and for **Yellowstone Park,** the greatest Park in the World, in which **Austin Sprinklers** are used almost exclusively.

Greater New York gets a train-load every now and then, while all the large cities are continually buying them either in train-loads or numerous car-loads.

They are made in six sizes and seven styles, and are the best and most efficient Sprinklers that were ever on wheels.

We certainly are getting the cream of the Sprinkler trade. Send for our large illustrated catalogue and you will know why.



Also the **Austin Steel Street Sweeper,** used everywhere and liked everywhere. Used and endorsed by all the leading contractors and cities. Steel frames. No wood parts to rot out. Simple and durable in construction. No complicated or intricate parts to get out of order. Sold on approval. Fully guaranteed.

THE AUSTIN-WESTERN COMPANY, Ltd.,

CHICAGO, ILL.

Omaha, Neb.—Has plans for $25,000 sewer system. A. Rosewater, city engineer.

Pasadena, Cal.—May sewer Penn and Montana streets and Summit avenue.

Peoria, Ill.—Has adopted resolutions for South Side sewer, embracing Lincoln avenue, Blaine, Garden, Water and Cedar streets: $100,000.

Putnam, Conn.—Lower branch of Legislature passed bill authorizing this city to issue $50,000 sewer bonds.

Quitman, Ga.—Has voted to issue $50,000 bonds for sewers. City clerk.

Rochester, N. Y.—Will soon let contract for Williams street sewer, one mile in length: $52,000.

St. Augustine, Fla.—May construct $94,000 sewerage system. Board of Trade.

St. Paul, Minn.—Board of Public Works recommends the issuance of $159,145 St. Anthony Park sewerage bonds.

Springfield, O.—Recently voted not to issue the proposed $225,000 bonds for sewers and sewage disposal plant.

Syracuse, N. Y.—Will sewer Madison street and Ostrom and Comstock avenues.

Tulsa, I. T.—Voted to issue $30,000 sanitary sewer bonds.

Ventura, Cal.—Voted to issue $10,000 bonds for storm sewers.

West Chester, Pa.—We are informed that plans, specifications, etc., for sewers and sewage disposal will be prepared and that engineer is to be selected. Committee will report on June 2nd. D. T. Sharpless, chairman.

Wyandotte, Mich.—May construct from ten to fifteen miles of sewers this year.

Contracts Awarded

Akron, O.—Contract for sewer in Rhodes avenue let to Matthew McCloud, $1,170; for Jewett avenue sewer, McAlonan Bros., $893.

Augusta, Ga.—Contract for brick sewer on Turkett Spring road, T. O. Brown and Son, city, $5,719.

Huntington, W. Va.—Awarded contract for 2,300 feet of 4-ft. x 6-ft. double ring brick sewer and 2,000 feet of 2½ x 3¾-ft. single ring brick sewer to C. O. Harrison, city.

Masillon, O.—Contract for 2,500 feet of 10-inch sewer in High and North streets let to Neidlinger and Kraft.

New Orleans, La.—Contract for new sewer let to Edward Irwin, Hamilton, La., at about $100,000.

St. Paul, Minn.—E. J. Kirkland received contract for main sewer on Finn avenue at $15,200.

Salem, Mass.—Contract for the outfall sewer was awarded to Patrick McGovern, 6 Beacon street, Boston, Mass., at $100,000. Iron pipe will be used.

Regina, N. W. Ter.—Dobson, Jackson and Fry, Winnipeg, Man., received contract for sewerage system for this city at $27,200.

WATER.

Albia, Iowa.—May install a water system: $66,000.

Athena, Ore.—Will lay two and one-half miles of six and eight-inch wood pipe and voted to issue $35,000 bonds for gravity water system.

Atlanta, Ga.—President of the water commissioners recommends the issuance of $250,000 bonds for the laying of an additional water main from the reservoir to the river and for the purchase of two extra pumps.

Aurora, Ill.—Will extend the water mains in South and State streets.

Baltimore, Md.—Has appropriated $60,000 for water department work in the new district. Has available $1,000,000 for extension of water supply and a new reservoir. Mayor Timanus.

Barberton, O.—Will soon want bids for laying 5,000 feet of water mains in Moore, Cornell and other streets.

Bowbells, N. D.—Voted to issue $6,000 water-works bonds.

Boulder, Colo.—Voted to issue $75,000 bonds for improvement of the water-works. E. Wilder, city clerk.

Boyce, La.—Recently voted to construct water-works and work will commence within thirty days.

Brandon, Minn.—May install tank and water mains for fire protection.

Bristol, Vt.—Will issue $55,000 bonds for water-works.

Brockton, Mass.—City Engineer Charles R. Felton will report on proposed high pressure water system.

Burlington, Vt.—Has appointed a committee to report on improving water-works and a filtration plant may be recommended. John B. Wheeler, chairman.

Carthage, Mo.—Will soon want bids for a municipal water-works.

Chadron, Neb.—Is having report made on improving the water system.

Chariton, Ia.—Has not yet sold water bonds.

Clinton, Minn.—Will construct $6,000 water-works system. Village clerk.

Cloquet, Minn.—May issue $60,000 water-works bonds.

Coalgate, I. T.—Has sold $63,000 bonds for water-works. City clerk.

Concord, N. H.—Has sold $45,000 water bonds.

Creston, Ia.—Will vote June 15th on water bond issue.

Danbury, Conn.—Legislature has passed the bill authorizing bond issue of $200,000 for completion of additional water supply.

Denton, Tex.—Will have plans made for $25,000 water system.

Donaldsonville, La.—Voted to issue water-works bonds. G. H. Richard, mayor.

Duluth, Minn.—May double size of West Duluth reservoir, making it 10,000,000 gallons capacity.

Elba, Ala.—Will equip water system with meters: not less than 60 nor more than 100, to be fitted with ¾-inch and ½-inch pipes. The mayor.

Frankfort, Ind.—Expert recommends rebuilding water-works: $87,000. Plans are being prepared.

Gainesville, Fla.—May improve water-works and add to capacity of reservoir. City clerk.

Greensboro, N. C.—Will vote on $75,000 bond issue for completing water main.

Hadley, N. C.—Voted to issue $40,000 bonds for completion of water system.

Highlands, N. J.—Has engaged engineer to prepare plans, etc., for water-works.

Huntley, Mont.—Bids are wanted June 28th for pumping station, concrete culverts, etc., along canal. Engineer U. S. Reclamation Service, Billings, Mont.

Jacksonville, Fla.—Report is to be made to Board of Trade on bond issue for extension of water mains and for other purposes.

Kansas City, Mo.—Collector of water rates, Elmer M. Powell, recommends establishment of water meter system.

Lawrence, Mass.—Has found water supply from driven well and will drive about 100 more and install a pumping plant and lay 6,500 feet of water main.

Lewisburg, Tenn.—Has recalled the election recently ordered on bond issue for water-works in order that a thorough investigation may be made as to the best system.

Lone Tree, Iowa.—May establish municipal water-works.

Marietta, O.—May equip the city with water meters. Board Public Service.

Melrose, Minn.—Voted for municipal water-works and bonds for same will be issued.

Moline, Ill.—City engineer recommends the installation of pumping station, reservoir, new intake pipe and the installation of water meters.

Montreal, Que.—Fire and Light Committee will buy tapping machine, valves and hydrants, lay water mains and new services: $20,000.

Morehead City, N. C.—Voted bonds for fire protection water system. Charles S. Wallace, mayor.

Muskogee, I. T.—Will vote on $100,000 water and sewer bond issue.

Nashwauk, Minn.—May install municipal water-works. T. R. Dodson, president.

Clean Out Your Sewers

Possible? Yes

The **Healey Sewer Cleaning Machine** cleans sewers that cannot be cleaned by any other method.

Simple—Effective—Economical

SEND FOR CATALOGUE

Healey Sewer Machine and Construction Company

10 TREMONT ST., BOSTON, MASS.

THIS IS THE SWEEPER

THAT DOES THE WORK
AND DOES IT WELL

The most economical and efficient street cleaning appliance manufactured.

Let us give you an instance. The city of Washington saved $15,647 in one year by the use of these machines. They pay for themselves in a year's time. Is not this worth the attention of every municipality that tries to keep its streets clean? Printed matter and full information on request.

SANITARY STREET SWEEPING CO.

Virginia Av. & 5th St., S. E. WASHINGTON, D. C

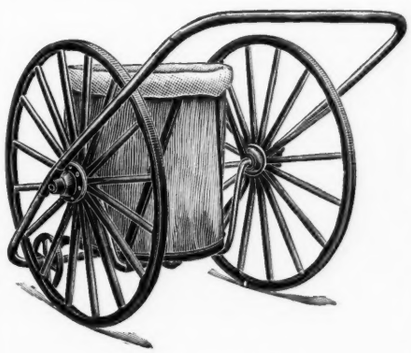
THE MENZIES STREET CLEANER

A workman can keep clean about fifty per cent. more street surface than by any other machine or contrivance, and will thus save the cost of the machine within a month or two. No shovel required. Refuse deposited in can with one motion. Machines are strong and neat. Will last for years.

Write us for further information.

MENZIES STREET CLEANER COMPANY

GLENS FALLS, NEW YORK



CARRIER WITH SACK.

THE NEWEST AND BEST

CAN CARRIER

THE City of New York has just awarded, in open competition, a contract for three hundred of these can carriers. Full information upon request.

WIRT & KNOX MFG. COMPANY,

22 N. Fourth Street, ... PHILADELPHIA, PA.

CARRIER WITH CAN.

Nevada, Mo.—Is having plans and surveys made for proposed municipal water-works, for which $90,000 bonds will be issued.

Newark, N. Y.—Will buy and improve local water-works: $64,000. Board Trustees.

New Britain, Conn.—Water Commissioners favor the gradual installation of water meters.

Northfield, Vt.—Will extend the water system.

Perrysburg, O.—Voted to issue $30,000 bonds for water-works. T. W. Franey, city clerk.

Piqua, O.—Will soon sell $65,000 water-works bonds. City clerk.

Port Huron, Mich.—Will lay 12,700 feet of six, ten and sixteen-inch water pipe. H. Burton.

Red Bluff, Cal.—May buy local water-works.

Rochester, N. Y.—Will extend the water mains this year. City clerk.

Salem, Va.—Will install 500,000-gallon pumping plant and may lay gravity water mains.

Sayre, Okla.—Bill providing for water-works bond issue has been vetoed by Governor.

Seneca Falls, N. Y.—Recently voted to issue $110,000 bonds for water-works system.

Shelbyville, Tenn.—Has authorized bond issue and secured engineer to report on municipal water plant.

Spokane, Wash.—Will have plans made for $490,000 water-works system.

Springfield, Mass.—Allen Hazen, New York, estimates cost of securing water supply from Little River at $1,827,000, with an additional $350,000 for a filter plant.

Stanhope, N. J.—Will vote at another special election June 6th on $10,000 bond issue for water plant.

Sumter, S. C.—Voted to buy local water plant: $120,000.

Union City, Mich.—Will vote on bond issue for municipal water-works.

Ventura, Cal.—Voted for municipal ownership of water plant and will issue $100,000 bonds for same.

Vermillion, S. D.—Voted for municipal ownership of water-works. City clerk.

Vidalia, La.—Voted to issue bonds for water-works. J. B. Boatner, Jr., mayor.

Warrenton, Va.—Has engaged engineer to do preliminary work for the extension and improvement of the water-works.

Waukesha, Wis.—Will consider municipal water-works. William Powrie, city engineer.

Williston, N. D.—Will take up question of water-works in about thirty days. D. C. Page, city auditor.

Wingham, Ont.—Will vote on construction of water-works system. Town clerk.

Winooski, Vt.—Voted to buy and improve local water system. H. A. Bailey, chairman Water Committee.

Youngstown, O.—Council is considering an ordinance providing for issuance of $40,000 bonds for water main extension.

CONTRACTS AWARDED

Alpena, Mich.—Contracts for the water-works were let as follows: Submarine construction, Murray Co., $23,875; 49-inch and 16-inch riveted steel pipe for same, Bay City Boiler Co., $8,600; 1,145 tons of cast iron pipe at $24.70 per ton and 855 tons of same at $25.45 per ton and specials at $50.00 per ton, American Car and Foundry Co.; pipe laying, William H. Chisholm, $17,317; valves, C. W. Thomas, $2,052; hydrants, Ludlow Manufacturing Co., $1,145.

Boston, Mass.—Contract for water system at Ft. Andrews, Mass., let to C. A. Kennedy, New York, $7,600; for submarine pipe line, John T. Langford, Boston, $24,045.

Ellisville, Miss.—Bailey Granite Co. received the contract for the water-works system.

Geneva, O.—It is reported that contract for extension of the water-works system was let to Hewitt and Hann at $7,563.

Gloucester, Mass.—Contract for pipe and specials let to Davis and Farnum Manufacturing Co., Waltham, Mass., at $2,749.

Hadley, Mass.—Contract for water pipe let to Fox and Co., New York, $21,957; contract for pipe laying, Lane Construction Co., Meriden, Conn., $9,140.

Hantsport, N. S.—Contract for water-works let to W. J. Mulhall, Middleton, N. S., $39,000.

Hoisington, Kan.—T. C. Brooks and Sons, Jackson, Mich., received the contract for water-works at $16,318.

Humansville, Mo.—Contract for water-works let to W. W. Cook and Son, Junction City, Kan., $9,447; steel tower and tank, Means and Fulton Iron Works, Birmingham, Ala.

Lorain, O.—Contract for settling basin at water-works pumping plant let to Carey Construction Co., Cleveland, O., $12,400.

New Orleans, La.—Allis-Chalmers Co. received contract for water-works pumping machinery at $479,980; United States Cast Iron Pipe and Foundry Co., Bessemer, Ala., received contract for 13,000 tons of 48-inch and 36-inch cast iron water pipe at $24.59 and $22.43 respectively.

Portland, Ore.—Contract for 2,012 tons of 16-inch cast iron water pipe let to Oregon Iron and Steel Co., city, $71,976.

Salt Lake City, Utah.—Contract for water main extensions for 1905 let to P. P. Ford and Co., Denver, Colo., $19,319.

LIGHTING.

Albany, N. Y.—Plans and specifications are being prepared for a municipal electric light plant.

Alma, Neb.—Will let contract June 8th for an electric light plant. The mayor.

Atlantic, Ia.—Will sell its electric light plant.

Austell, Ga.—May install small electric light plant. C. J. Shelverton, mayor.

STUDEBAKER WAGON AN INFRINGEMENT

AUSTIN PATENTS SUSTAINED

We have just obtained a final decree in UNITED STATES CIRCUIT COURT OF THE NORTHERN DISTRICT OF ILLINOIS, against STUDEBAKER BROS. MANUFACTURING COMPANY OF SOUTH BEND, INDIANA, finding infringement of our patent No. 532,785, dated January 22, 1895, on DUMP WAGONS, and awarding us a perpetual injunction against the further infringement by making, using or selling such infringing wagons.

The defendants were given an opportunity of protecting the purchasers of their infringing wagons by settling with us for each such wagon sold, but their having failed to do so, leaves us no recourse except against the owners and users of such wagons.

WE HEREBY NOTIFY ALL USERS OF STUDEBAKER DUMP WAGONS having bottom boards suspended by chains, as in the Austin Dump Wagon, that unless the use of such wagons is immediately discontinued, or the right to continue use is procured from us, we shall take the proper legal steps to stop such use, or collect damages therefor in accordance with our rights established by the decree just awarded us.

Here is part of the decree:—

"Fourth—IT IS FURTHER ORDERED, ADJUDGED AND DECREED, that a writ of Injunction issue out of, and under, the seal of this Court, directed to the said Studebaker Brothers Manufacturing Company, and its agents, attorneys, servants and workmen, enjoining and restraining them from the further infringement of said Letters Patent.

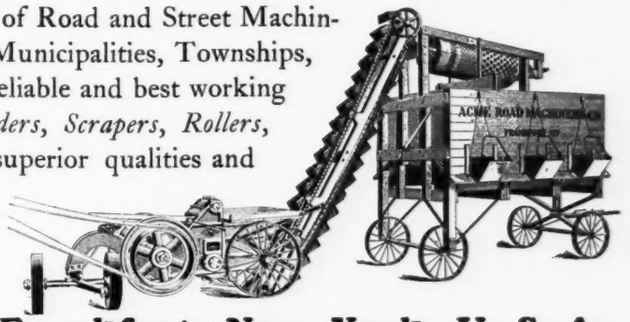
"Fifth—IT IS FURTHER ORDERED, ADJUDGED AND DECREED, that the defendant, the Studebaker Brothers Manufacturing Company, pay the costs herein to be taxed and that the complainant have execution therefor."

Other manufacturers are trying to pirate our patents, and WE SHALL IMMEDIATELY CALL THEM TO ACCOUNT, as we have the Studebaker Brothers Manufacturing Company. The safest and best way is to buy only the reliable and time-tried "Austin" and avoid trouble.

AUSTIN MANUFACTURING COMPANY, CHICAGO.

"A Purchaser of Acme Machinery is a Satisfied Purchaser"

We Manufacture and Supply Everything in the Line of Road and Street Machinery. Our specialty is *Complete Rock Crushing Outfits* for Municipalities, Townships, Counties, Contractors, etc., who want the strongest, most reliable and best working machinery. *Road Machines, Dump Wagons, Plows, Graders, Scrapers, Rollers, Sprinklers, Sweepers.* The *Acme* product possesses many superior qualities and distinctive features. Every possible purchaser will find it of advantage to secure our Illustrated Catalogues.

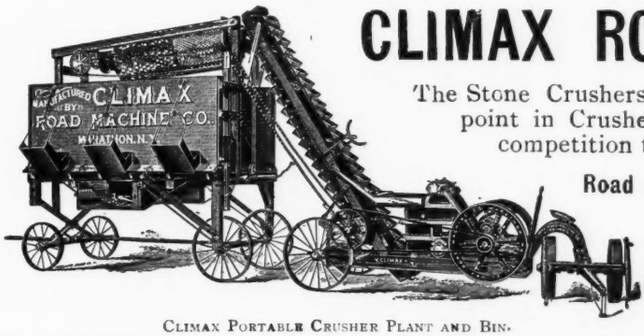


Correspondence Solicited. Inquiries Promptly Answered.

Acme Road Machinery Company, Frankfort, New York, U. S. A.

"The road to success is plain as the road to market," and the road to successful road building is plain to the Road Builder who uses the

CLIMAX ROAD BUILDING MACHINERY



CLIMAX PORTABLE CRUSHER PLANT AND BIN.

The Stone Crushers made under the name "Climax" represent the highest point in Crusher development. From the toughest stone to the keenest competition they are "Crushers."

Road Rollers, Engines, DISTRIBUTING Wagons, Crusher Plants, Highway Bridges and Steel Structural Work

You need our Catalog--it's free.

Climax Road Machine Co.

MARATHON, N. Y.

CHICAGO & ALTON RAILWAY

"THE ONLY WAY"

THE CHICAGO & ALTON runs the largest passenger engines in the world

They keep the trains on time

Between Chicago, St. Louis, Kansas City and Peoria

GEO. J. CHARLTON, General Passenger Agent
CHICAGO, ILL.

MANUFACTURERS

Contemplating establishing plants in the West should take advantage of a location on

THE NORTH-WESTERN LINE

Chicago & North-Western Ry.

which reaches the famous

WATER POWERS,
COAL FIELDS,
IRON ORE RANGES,
HARD AND SOFT
LUMBER DISTRICTS,
MINING DISTRICTS

of the West and Northwest, and affords the best means of transportation to the markets of the world.

FOR FURTHER PARTICULARS APPLY TO

MARVIN HUGHITT, Jr., *Freight Traffic Manager,* E. D. BRIGHAM, *Gen'l Freight Agent,*
CHICAGO.

NW513

Breckenridge, Mo.—Voted to issue $10,000 bonds for electric light plant.

Brookside, W. Va.—May issue bonds for an electric light plant.

Burlington, N. C.—Voted to issue $10,000 bonds for installing new machinery in the electric light plant.

Burlington, Wis.—Is taking steps to construct a fifty 2,000-candle-power electric light plant and $8,000 bonds for same have been voted. John Pieters, chairman Electric Light Committee.

Central Falls, R. I.—May construct a municipal electric light, heat and power plant, capacity to be 185 arc and 500 incandescent lamps. W. H. Goldsmith, clerk Lighting Committee.

Charlottetown, P. E. I.—Will petition Legislature for authority to issue $75,000 bonds for an electric light plant.

Coin, Ia.—Is agitating question of municipal lighting. City clerk.

Coleville, Utah.—Will vote on issuance of $10,000 electric light bonds.

Collierville, Tenn.—Has plans prepared for an electric light plant. City clerk.

Creston, O.—Will vote June 15th on issuance of light bonds.

Dauphin, Man.—Will vote on $25,000 bond issue for electric light plant.

Dodge, Neb.—Will sell bonds for light plant June 1st. No engineer has been appointed yet.

Dunn, N. C.—May install additional electric light apparatus.

Fayetteville, N. C.—Voted to issue $30,000 bonds for doubling capacity of the electric light plant. C. P. MacMillan, mayor.

Fort Worth, Tex.—The American Acetylene Gas Company has been incorporated with $60,000 capital. J. T. Johnson, W. S. Heaton and J. B. Lanerie.

Gadsden, Ala.—Franchises for illuminating gas plant were given to C. B. Foreman, John B. Hammond and Thomas H. Stephens.

Girard, Kan.—Engineer has been engaged to plan improvements to electric light plant. City clerk.

Glasgow, Mont.—Cost of the proposed electric light and water plant is estimated at $33,000.

Guelph, Ont.—Report has been made on the proposed improvement to the municipal gas plant and it recommends new gas holders, new mains and the rebuilding of the plant, estimated cost of which is $65,000. Matter will be voted on. J. Hutcheon, city engineer.

Harriman, Tenn.—Estimates are being prepared for a $40,000 electric light plant by H. A. Coles, Atlanta, Ga.

Hermon, N. Y.—Village is being canvassed in view of installing an electric light plant.

Highlands, N. J.—Has engaged engineer to prepare plans and specifications for an electric light plant.

Homer, La.—May construct an electric light plant. City clerk.

Ilion, N. Y.—The Governor has signed bill authorizing this city to issue bonds for repair of the electric light plant.

Jackson, Ga.—Will have plans prepared for the proposed electric light plant and will vote on the matter of its installation when these are completed.

Joplin, Mo.—Will call for bids soon for the erection of the additional municipal electric light plant. M. J. Fristoe, superintendent.

Kings Mountain, N. C.—Will issue $15,000 bonds for an electric light plant.

Lagrange, Ga.—Has not yet sold bonds for the proposed electric light plant and no engineer has been appointed. Estimated cost of the plant is $25,000. No steps will be taken for at least thirty days.

Lake Charles, La.—Will vote on $60,000 bonds issue for the purchase of the local electric light plant or the erection of a new one.

Lockland, O.—Has voted to issue bonds for the enlargement of the electric light plant. City clerk.

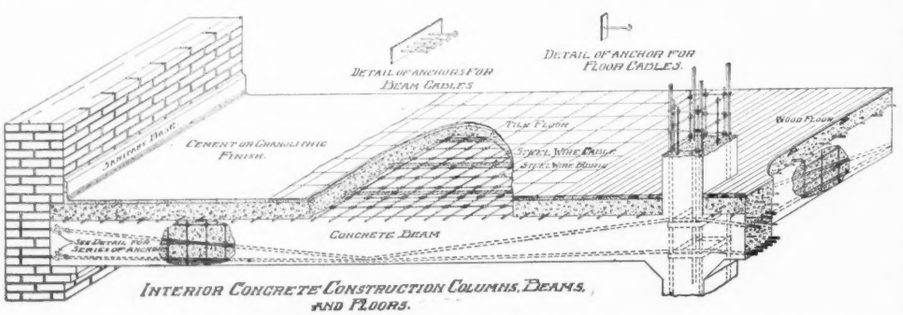
Los Angeles, Cal.—Voted to issue $25,000 bonds for erection of electric light plant.

Marion, Ind.—Is considering municipal ownership of the electric light plant.

Mayfield, Ky.—May issue light bonds.

Melrose, Minn.—Voted for municipal ownership of the light plant and will issue bonds.

THE INTERNATIONAL SYSTEM OF CONTINUOUS REINFORCEMENT



INTERIOR CONCRETE CONSTRUCTION COLUMNS, BEAMS, AND FLOORS.

EITHER FOR ENTIRE CONCRETE STRUCTURES OR REINFORCED CONCRETE WORK IN CONNECTION WITH STRUCTURAL STEEL

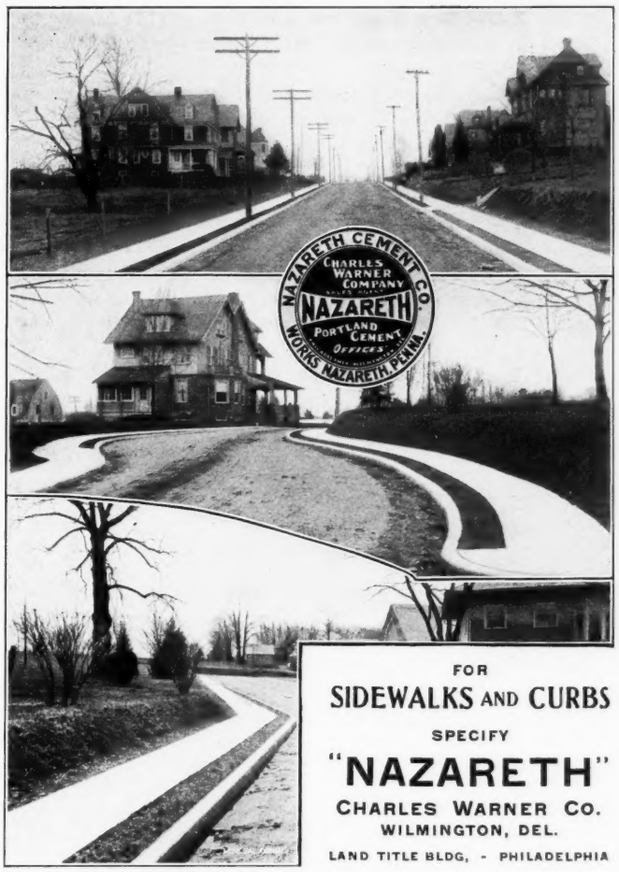
Scientific, Practical and Economical

The International F. and Fireproofing Co. COLUMBUS OHIO

THE WINGET CONCRETE MACHINE COMPANY, 409 The New Hayden Bldg., COLUMBUS, OHIO.

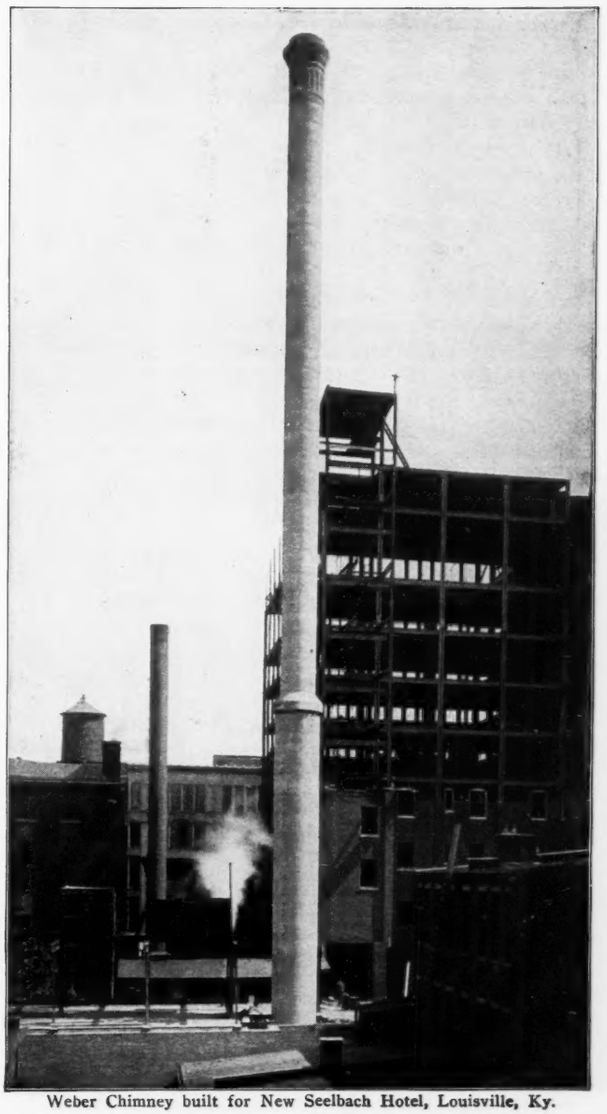
The Winget Machine for making hollow concrete building blocks is the only **AUTOMATIC, ADJUSTABLE** and **PERFECT** working machine yet produced. It is widely adjustable, making blocks for walls from four to eighteen inches thick, as well as many special designs. It is practically a combination of **TWENTY** machines in **ONE.** The saving of time, material and labor with this machine actually pays its price in a short time. If you are interested write for catalogue and special information.

MACHINE, SHOWING ROCKING POSITION FOR FACING.



FOR
SIDEWALKS AND CURBS
SPECIFY
"NAZARETH"
CHARLES WARNER CO.
WILMINGTON, DEL.
LAND TITLE BLDG, - PHILADELPHIA

WEBER
Steel-Concrete Chimney Company

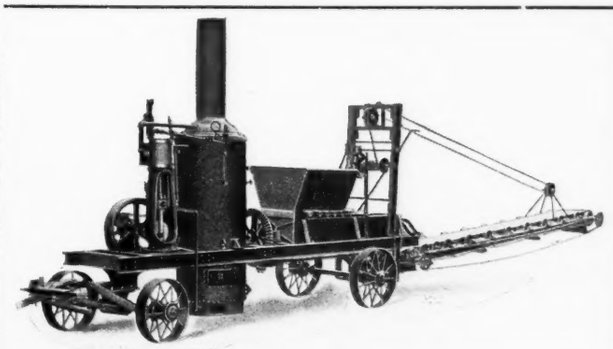


Weber Chimney built for New Seelbach Hotel, Louisville, Ky.

DRAKE'S PATENT CONCRETE MIXING MACHINERY

For STREET and GENERAL CONTRACT WORK

Send for New Catalogue "M"



Drake Standard Machine Works
298 to 302 West Jackson Boulevard
CHICAGO, ILLINOIS

NATIONAL
LIFE
BUILDING
CHICAGO, ILL.

Memphis, Tenn.—John Hausler, 120 Monroe street, wants prices on acetylene gas lighting for a system of from twenty to thirty lights.

Monmouth, Ill.—Is taking steps for municipal lighting plant.

Monroe, Ga.—Has engaged J. B. McCrary, Senoia, Ga., to prepare plans and specifications for a $15,000 electric light plant.

Montreal, Que.—Board of Aldermen is considering municipal gas plant.

Morehead, N. C.—Voted to issue bonds for an electric light plant. Charles S. Wallace, mayor.

Napanee, Ont.—May erect a $40,000 municipal electric light plant. W. A. Grange, town clerk.

Newark, O.—May rebuild city electric light plant.

Newport, Ky.—Wants bids June 8th for supplying city with gas for twenty years. J. B. Morlidge, city engineer.

North Yakima, Wash.—George M. Stewart, of Seattle, is interested in the proposed $50,000 gas plant to be erected here—either coal gas or acetylene.

Ocilla, Ga.—May issue $20,000 bonds for an electric light plant and water-works.

Orangeburg, S. C.—Will improve the electric light plant: includes, one 60-kw., S. P. alternator; one 60-cycle, 2,300-volt alternating current series arc lamp system (seventy-five lamps) and will cost from $4,000 to $6,000. J. E. Salley, city engineer.

Paris, Ill.—Council may double the capacity of the electric light plant.

Providence, Utah.—May install an electric light plant.

Richmond, Va.—Committee reported that the proposed municipal lighting plant will cost $400,000 and that it will light all the streets, parks and the city hall and furnish power for the water-works and for commercial purposes. Mr. Dabney, chairman.

Rutherford, N. J.—May install a municipal lighting plant.

Sanborn, Minn.—Has voted to issue $6,000 bonds for a lighting plant. City clerk.

Sandy Hill, N. Y.—Voted not to issue bonds for an electric light plant.

Santa Barbara, Cal.—Commercial Club has plans for the erection of a lighting plant to be under city control.

Shelbyville, Tenn.—Wants estimates for furnishing twenty or more 2,000 c-p. arc lamps. William P. Cooper, chairman.

Shreveport, La.—Has secured expert to estimate the cost of municipal light and an election may be held to vote on erection of same. City clerk.

Starkville, Miss.—Voted to issue $8,000 bonds for the improvement of the electric light plant and the water-works. City clerk.

Traverse City, Mich.—Has appointed committee to investigate the advisability of municipal ownership of the electric light plant. City clerk.

Tunica, Miss.—Is purchasing the local electric light plant and will enlarge same.

Union City, Mich—Will vote on bond issue for municipal electric light plant.

Ventura, Cal.—Voted to construct an electric light plant and $25,000 bonds will be issued.

Vermillion, S. D.—Has voted for municipal ownership of the light plant.

Washtucna, Wash.—Is considering the installation of acetylene gas system.

Wautoma, Wis.—Will vote on bond issue for municipal lighting plant.

Waynesville, N. C.—Voted to install an electric lighting system.

Webster City, Ia.—May erect a municipal gas plant.

Williston, N. D.—Will consider, in thirty days, the matter of erecting an electric light plant.

Winfield, Kan.—Voted to issue $15,000 bonds for the completion of the electric light plant.

BUILDINGS.

Albany, Ga.—Dougherty County will vote at once on $125,000 bond issue for new high school.

Audubon, Iowa.—County Board of Supervisors is planning for new courthouse and an election will be held June 13th to vote on $65,000 bond issue for same.

Baltimore, Md.—Plans have been completed for repair of the west side of the courthouse which was damaged by the recent fire: $150,000.

Barbourville, Ky.—Knox County will vote in November on $30,000 bond issue for new courthouse.

Brazil, Ind.—May erect $35,000 high school.

Brockton, Mass.—Plans for an armory have been completed: $30,000.

Buffalo, N. Y.—Board of Supervisors will provide for bond issue of $150,000 for an armory.

Caldwell, Idaho.—Plans will be made for a $65,000 courthouse. Wayland and Fennell, architects, Boise, Idaho.

Calgary, N. W Ter.—Will erect $12,000 police station. C. Macmillan.

Clarksburg, W. Va.—Voted to issue $60,000 bonds for new school.

Columbia, Miss.—Has selected architect to prepare plans for a $30,000 school.

Deadwood, S. D.—County has adopted plans for $100,000 courthouse.

Detroit, Mich.—Will erect five schools, to cost between $50,000 and $60,000 each.

Devil's Lake, N. D.—Ramsey County will erect a jail. E. S. Eich, county auditor.

Durham, N. C.—Voted to issue $50,000 for new school building. J. F. Freeland, mayor.

Edna, Tex.—Attorney-General has approved issue of $45,000 Jackson County courthouse bonds.

Ellisville, Miss.—Board of Supervisors will sell $50,000 courthouse bonds.

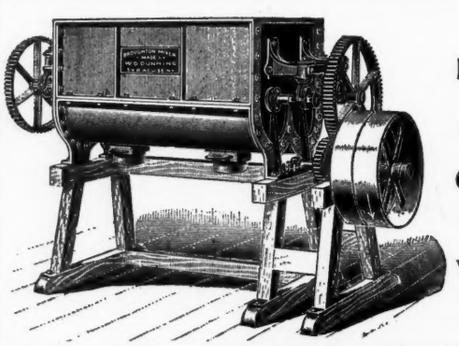
Englewood, N. J.—Has completed plans for $75,000 school.

Evansville, Ind.—Will rebuild Campbell street school, recently burned: $40,000.

Fairmont, W. Va.—Voted to issue $150,000 for four school buildings. City clerk.

Greensboro, N. C.—Will vote on $50,000 bond issue for new school building.

THE PROCEEDINGS
OF THE
Engineers' Club of Philadelphia
EDITED BY THE PUBLICATION COMMITTEE
PUBLISHED QUARTERLY IN
JANUARY APRIL JULY OCTOBER
A Splendid Advertising Medium
For Space and Rates, address
GEO. T. GWILLIAM, Ch'r. Adv. Committee OR WALTER LORING WEBB, Secretary
1122 Girard Street, Philadelphia
SUBSCRIPTION PRICE, $2.00 per Annum

The BROUGHTON MIXER

Especially adapted for Mixing Material for Artificial Stone, AND Cement Building Blocks, Etc.
W. D. DUNNING
923 Water Street
SYRACUSE, N. Y.

When Purchasing a Concrete Mixer, get one that will mix thoroughly, quickly, cheaply, and is self-cleansing

THE

CHICAGO IMPROVED CUBE CONCRETE MIXER

IS THE ONLY ONE TO CONSIDER

"It Has No Insides"

Illustration of the mixer in discharging position.

It is a well known fact that mixers having inside blades pocket and separate the material as it enters, and again in turn scoop it up from the bottom, and require constant attention by frequent flushing, as also scraping and pounding at short intervals on the outside of drum to dislodge the material which is constantly attaching itself to the inside mechanism, such as vanes, scoops, paddle arms, inside shaft, or whatever it may be, not only causing the material to ball, but greatly decreasing the life of the machine, as these accessories, by reason of their resistance, not only wear out rapidly but largely increase the strain on the gears, frame, etc. *Our CUBE MIXER, with ordinary use, is guaranteed not to clog.*

Seven Sizes: Batches 2 to 64 cubic feet four to eight yards per hour. Any combination as to mounting and power.

MUNICIPAL ENGINEERING AND CONTRACTING CO.

RAILWAY EXCHANGE, CHICAGO, ILL.

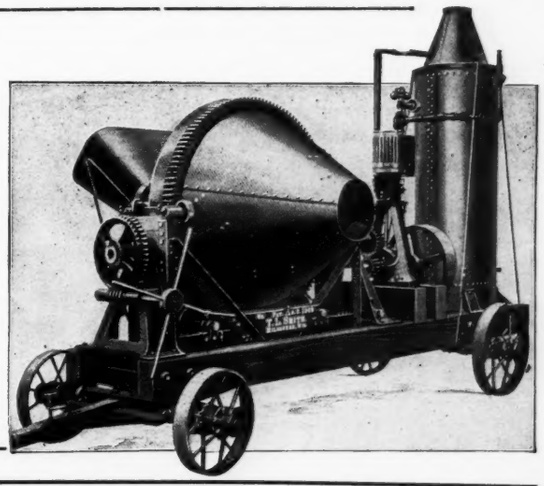
Send for Catalogue No. 37.

There are Mixers AND MIXERS

But only one

Smith Concrete Mixer

CONTRACTORS SUPPLY CO. AND EQUIPMENT



New York Office
170 Broadway
Tel. 3413 Cortlandt

MAIN OFFICE
Old Colony Building, CHICAGO
Tel. Harrison 1907

Kansas City Office
509 West 5th St.
Tel. Main 2148

WARREN CONSTRUCTION COMPANY

216 OREGONIAN BUILDING

PORTLAND, OREGON

ENGINEERS AND CONTRACTORS FOR

WARREN'S BITULITHIC PAVEMENT

Correspondence Invited.

Full information sent on application.

Little Rock, Ark.—May erect City Hall and auditorium: $150,000.

Lyons, Iowa.—Plans have been prepared for a $40,000 brick and stone high school.

Memphis, Tenn.—Has authorized issuance of $125,000 bonds for school buildings.

Milwaukee, Wis.—Legislature passed bill appropriating $85,000 for new normal school here. Wants bids for North Side high school: $139,000.

Minneapolis, Minn.—Will sell $200,000 bonds for new school buildings.

Montgomery, Ala.—State will add to and improve the Capitol building: $70,000.

Nashville, Tenn.—Howard County has plans and will soon want bids for brick courthouse.

Oswego, N. Y.—State Senate passed bill authorizing appropriation of $75,000 for an armory here.

Palatka, Fla.—Putnam County Commissioners have plans for new courthouse.

Passaic, N. J.—May erect a $100,000 high school.

Philadelphia, Pa.—May erect a $400,000 high school on Lehigh avenue; an $80,000 school on Huntington Park avenue and Sixth street; add wings to the E. T. Steel school, $20,000; rebuild Oakdale school at cost of $80,000, and at Foust and Oakdale streets, $30,000.

Platteville, Wis.—Legislature has passed bill appropriating $100,000 for a normal school building.

Plaquemine, La.—Police jurors of Iberville parish want bids June 10th for a courthouse.

Providence, R. I.—A $275,000 courthouse may be erected.

Pueblo, Colo.—Will soon let contracts for a $400,000 high school.

Redondo, Cal.—May erect a $20,000 city hall. City Board of Trustees.

Richmond, Va.—Has accepted plans for a $300,000 high school building.

Rockford, Ill.—Has engaged architect to prepare plans and to supervise the erection of a city hall.

St. Boniface, Man.—Will erect a $30,000 town hall. Cecil Goddard, town engineer.

San Francisco, Cal.—Has accepted plans for the Washington Grammar School: $110,000. Board of Education.

San Luis Obispo, Cal.—Voted to issue $30,000 bonds for a new high school.

Saugus, Mass.—Is having plans made for a $100,000 school.

Springfield, Ill.—A $350,000 courthouse may be erected. City clerk.

Stephenville, Tex.—Erath County voted to issue $30,000 bonds for a jail.

Syracuse, N. Y.—State Senate passed bill on the third reading for appropriation of $175,000 for an armory at this city.

Troy, Kan.—Doniphan County will have plans prepared for a courthouse.

Utica, N. Y.—Will call for bids for courthouse. Last year all bids were rejected as being high and the plans have been altered so as to lower cost by $50,000. The lowest former bid was $735,373. County Building Committee.

Wallace, Idaho.—Shoshone County wants bids July 1st for four-story courthouse, to cost $70,000.

Washington, D. C.—Bids are wanted by James Knox Taylor, supervising architect, Treasury Department, as follows: June 8th, for post-office at Amesbury, Mass.; June 19th, post-office at Atlantic, Ia.; June 20th, post-office at Colorado Springs, Colo., and June 21st, for post-office at Winston, N. C.

Water Valley, Miss.—Yalobusha County Board of Supervisors will issue $50,000 bonds for a jail.

Winnipeg, Man.—Voted to issue $200,000 bonds for new school buildings. C. W. Brown, city clerk.

Zion City, Ill.—Has voted to issue $35,000 bonds for a new city hall.

MISCELLANEOUS.

Albany, N. Y.—Resolutions have been passed by council for investigation of cost of garbage disposal plant. Alderman McGraw.

Baltimore, Md.—Has available $6,000,000 for modern docks. Recently voted to issue $1,000,000 bonds for a chain of parks and boulevards and $2,000,000 bonds for the development of the Annex. Has $630,000 yet to be spent for completion of the electrical conduit system. Mayor Timanus.

Bloomington, Ill.—Voted to establish a garbage crematory, it is reported.

Chicago, Ill.—It is reported that Mayor Dunne recommends garbage crematories in the north and south sides of the city.

Coronado, Cal.—May construct a sea wall. Andrew Ernst, city engineer.

Grand Rapids, Mich.—Garbage Committee will ask for $30,000 for garbage disposal.

Great Falls, Mont.—Voted to issue $10,000 for a public bath.

Kansas City, Mo.—Will buy twelve street flushing machines. Has $100,000 for cleaning 350 miles of paved streets this year. W. C. Brooks, superintendent of streets.

Little Rock, Ark.—Maj. G. D. Fitch, U. S. Engineers, wants bids June 10th for American Portland cement for Lock No. 3, Upper White River, Ark.

Lockport, N. Y.—Board of Health may establish new system of garbage collection and disposal.

Milwaukee, Wis.—Special Committee is collecting data on converting garbage into fuel briquettes. V. J. Schoenscker, secretary.

Montreal, Que.—Fire and Light Committee will erect $10,000 garbage crematory in East End.

San Antonio, Tex.—Will let contract for 10,000 enameled street signs: $2,000.

Toledo, O.—Will buy 5,000 more metal plate street signs.

Washington, D. C.—Let contract for collection and disposal of ashes and garbage, etc.: Stutler and Ready, for removal of ashes, etc., from the District buildings at 41 cents per cubic yard; to same company for the removal and disposal of night soil in District for five years at $16,500 per year; for collection and disposal of ashes other than from District buildings, for one year, to S. P. Bayly, at $54,000, and to same party for collection of miscellaneous refuse for two years at $14,000 per year.

Washington, Pa.—May erect a garbage crematory.

Waterbury, Conn.—Lower branch of Legislature reported to have passed bill authorizing this city to issue $250,000 bonds for a public park system.

Watertown, N. Y.—Plans and specifications have been prepared for underground conduits for wires: $200,000. City Engineer Baer.

Southern Creosoting Company, Ltd.

SLIDELL, LOUISANA.

Located in the finest Long Leaf Yellow Pine District in the United States. Capacity 22,000,000 feet B. M. per annum.

The United States Sand Filtration Company

Filter Bed, Indianapolis Water Co., Showing Method of Underdraining.

Constructors of

Filtration Systems

BOTH SAND AND MECHANICAL

If interested in the subject of public water supply, we will be glad to give you full information and refer to plants in operation.

Results Guaranteed

Correspondence Invited

ENGINEERING OFFICES AND LABORATORIES:
113 Monument Place, INDIANAPOLIS, IND.

Main Office:
EMPIRE BUILDING
PITTSBURG, PA.

A Southern Location

for your Home,
your Manufacturing Plant,
or your Business.

Farms in Virginia, North and South Carolina, Georgia, Alabama, Mississippi, Kentucky, and Tennessee.

Good lands at low prices.

A healthy climate, long growing season, and an all-the-year working season.

The South is now making greater progress than any other section. If you would learn about its developments and the opportunities for good locations along the Southern Railway, write for copies of our publications, which will be ent free on request.

M. V. RICHARDS,
Land and Industrial Agent,
Southern Railway,
Washington, D. C.

YES

There are other railroads between the east and the west.

BUT

it is always well to secure the best you can for the money.

THEREFORE

You should bear in mind this remark of an experienced traveler:

"For the excellence of its tracks, the speed of its trains, the safety and comfort of its patrons, the loveliness and variety of its scenery, the number and importance of its cities, and the uniformly correct character of its service, the New York Central & Hudson River Railroad is not surpassed by any similar institution on either side of the Atlantic."

Send to George H. Daniels, General Passenger Agent, Grand Central Station, New York, a 2-cent stamp for a 52-page, illustrated Catalogue of the "Four-Track Series."

SOME OF THE VERY BEST BOOKS RELATING TO MUNICIPAL and PUBLIC WORKS

MUNICIPAL PUBLIC WORKS: THEIR INCEPTION, CONSTRUCTION, AND MANAGEMENT.—By S. Whinery, C. E. 341 pages. Cloth, $1.50 net.

CONTENTS.—Importance of Municipal Public Works. Municipal Organization. Preparations for Municipal Work. Direct Work *vs.* Contract Work. Advertising Opening Bids, and Awarding Contracts. The Contract. The Contractor. The Supervision of Public Work. Maintenance and Repair of Public Works. Economy, Real and False. Guaranteeing Public Work. Special Assessments. Municipal Accounts and Uniform Accounting. Municipal Ownership. Quasi-Public Corporations and Their Control.

MUNICIPAL ADMINISTRATION.—By John A. Fairlie, Ass't Prof. Administrative Law, Univ. of Mich. About 450 pages. $3.00 net.

CONTENTS—The Cities of Antiquity. Medieval Cities. European Cities, 15th-18th Centuries. The English Boroughs. Municipal Development of the United States. French Municipal History Since 1789. German Cities in the 19th Century. Public Health and Safety. Charities and Provident Institutions. Education. Municipal Improvements. Municipal Expenditures. Municipal Debts. Municipal Revenues. Finance Administration. The Council. Administrative Officials. The Mayor. Proposed Plans of Municipal Organization.

THE GOVERNMENT OF MUNICIPALITIES.—By Dorman B. Eaton. $4.00 net.

CONTENTS.—Nature of the Evils in American Municipal Government. Relation of Political Parties to Home Rule and Municipal Administration. Municipal Government by Party, as Illustrated by the Tammany Democracy. Vicious Conditions and Practices Considered and Remedies for Them Proposed. Free Nominations and Free Voting. Functions and Relations of Cities, Councils and Mayors. Constitution and Membership of a City Council. Municipal Government in Great Britain. Municipal Government in Continental Europe. Election of Mayors and Their Powers and Functions. School Administration and Sanitary Administration. Police Administration. Judicial Administration in Municipalities. The Charter of Greater New York as an Admonition in City Extension and a Lesson in City Party Government.

MUNICIPAL PROBLEMS.—By Frank J. Goodnow, Prof. of Administrative Law, Columbia University. $1.50 net.

CONTENTS.—History of Municipal Organization in the U. S. The Position of the City. The Sphere of Municipal Activity. The Relation of the City to the State. The Central Administrative Control Over Cities in Europe. The Effects of the Central Administrative Control in England. Universal Suffrage. Municipal Government and National Political Parties, The City Council. The City Executive. The Metropolitan City.

MUNICIPAL HOME RULE.—By Frank J. Goodnow, Prof. of Administrative Law, Columbia University. 283 pages. $1.50 net.

CONTENTS.—The Public Character of American Municipal Corporations. The Effect of the American System of Protecting Private Rights, etc. The Effects of American Law as to Municipal Powers, etc. The Constitutional Limitations of the Power of the Legislature over Municipal Affairs. Means of Delimiting the Sphere of Private Action of Municipal Corporations. What Are Municipal Affairs from the Point of View of the Liability of Municipal Corporation for Torts? What Are Municipal Affairs from the Point of Vitw of the Liabilities of Municipal Corporation for their Management of Property? What Municipal Property is Protected by the Constitutional Provisions Protecting Private Property? What Municipal Property is Subject to Alienation? What is the Sphere of Private Municipal Action Recognized by the American Law? European Methods of Distinguishing and Securing the Sphere of Municipal Home Rule.

MUNICIPAL ENGINEERING AND SANITATION.—By M. N. Baker, Assoc. Ed'r of *Eng'ing News*. $1.25 net.

CONTENTS.—Ways and Means of Communication. Municipal Supplies. Collection and Disposal of Wastes. Protection of Life, Health, and Property. Administration, Finance, and Public Policy.

AMERICAN MUNICIPAL PROGRESS: CHAPTERS IN MUNICIPAL SOCIOLOGY.—By Charles Zueblin, Prof. of Sociology, University of Chicago. 380 pages. $1.25 net.

CONTENTS.—Introduction—Municipal Sociology. Transportation. Public Works. Sanitation. Public Schools. Public Libraries. Public Buildings. Parks and Boulevards. Public Recreation. Public Control, Ownership, and Operation.

THE AMERICAN CITY: A PROBLEM IN DEMOCRACY.—By Delos F. Wilcox. 423 pages. $1.25.

CONTENTS.—Democracy and City Life in America. The Street. The Control of Public Utilities. Civic Education, or the Duty to the Future. The Control of Leisure Municipal Insurance. Civic Coöperation. Local Centers of Civic Life. Popular Responsibility. Official Responsibility. Local Responsibility, or Municipal Home Rule. Municipal Revenues. Municipal Debt. A Program of Civic Effort.

MODERN CIVIC ART; OR THE CITY MADE BEAUTIFUL.—By Charles Mulford Robinson. 8vo, 390 pages, beautifully illustrated. By mail, $3.20.

CONTENTS.—A New Day for Cities. What Civic Art Is. The Water Approach. The Land Approach. The Administrative Center. The Street Plan of the Business District. Architecture in the Business District. The Furnishings of the Street. Adorning with Fountains and Sculpture. Street Plotting Among the Homes. On Great Avenues. On Minor Residential Streets. Among the Tenements. Comprehensive Planning. Open Spaces. Parkways. Distribution and Location of Parks. Park Development. Temporary and Occasional Decoration. Index.

PRINCIPLES OF SANITARY SCIENCE AND THE PUBLIC HEALTH: WITH SPECIAL REFERENCE TO THE CAUSATION AND PREVENTION OF INFECTIOUS DISEASES.—By William T. Sedgwick, Prof. of Biology, etc., Mass. Institute of Technology. $3.00 net.

CONTENTS.—Health and Disease. Infection and Contagion, Their Dissemination and Control. Fundamental Problems of Public Sanitation.

EARTH AND ROCK EXCAVATION: A Practical Treatise.—By Charles Prelini, C. E., Author of "Tunneling." With Tables, and many Diagrams and Engravings. 8vo. Cloth. Illustrated. About 365 pages. Price, $3.00 net.

CONTENTS.—Graphical Representation of Earthwork. Plans and Profiles. Methods of Calculating Quantities and Cost of Earthwork. Cuts and Fills. Borrow-pits and Spoil-banks. Classification of Materials. Rock Excavations without Blasting. Excavation of Rock by Blasting; the Drilling of the Holes. Rock Excavation by Blasting; Explosives and their Transportation and Storage. Rock Excavation by Blasting; Fuses, Firing and Blasting. Earth Excavation; Hand-tools, Machine Excavation. Earth Excavation; Continuous Digging-machines. Earth Excavation; Intermittent Digging-machines. Methods of Hauling Excavated Materials on Level Roads. Hauling Excavated Materials on Horizontal Roads. Method of Hauling Excavated Materials on Inclined Roads. Vertical Hauling or Hoisting of Excavated Materials. Transporting Excavated Materials by Aerialways. Transporting Excavated Materials by Cableways. Transporting Excavated Materials by Telpherage. Chains, Ropes, Buckets, Engines, and Motive Power. Animal, and Mechanical Labor. The Direction of Excavation Work. Shrinkage of Earth. Cost of Earthwork. Examples of Large Canal Excavation Works. Index.

PURIFICATION OF SEWAGE AND WATER.—By W. J. Dibdin, F. I. C., F. C. S. Third Edition, Revised and Enlarged. 8vo. Cloth. Illustrated. 379 pages. Price, $6.50.

CONTENTS.—Introduction. General Considerations. Antiseptics, or Preservation for Limited Periods. Bacteriological Methods. Precipitation. Experiments at Massachusetts and London. Sutton Experiments. The Septic Tank and Other Systems. Land Treatment Versus Bacteria Beds. Manchester Experiments. Leeds Experiments. The Bacterial Treatment of Factory Refuse. Screening. The Purification of the Thames. The Discharge of Sewage into Sea-Water. The Filtration of Potable Water. Systematic Examination of Potable Water. The Character of the London Water Supply. The Action of Soft Water upon Lead. The Absorption of Atmospheric Oxygen by Water. Analyses and their Interpretation. Ventilation and Deodorization of Sewers. The Royal Commission on Sewage Disposal. Examination for Matters in Suspension. Dissolved Oxygen. Index. List of Illustrations, Diagrams and Tables.

THE BACTERIAL PURIFICATION OF SEWAGE. Being a Practical Account of the Various Modern Biological Methods of Purifying Sewage.—By Sydney Barwise, County Medical Officer of Derbyshire. 8vo. Cloth, with Plates and Diagrams. Price, $2.50 net.

CONTENTS.—Report of Royal Commission on Sewage Disposal. Volume of Sewage. Storm Water. The Standard of Purification. Methods of Purification. Precipitation Tanks. Purification by Biological Methods.—Two Stages in Purification. Necessity for Detritus Tanks. Liquefaction of Sewage. Closed v. Open Septic Tanks. Anaerobic Bacteria Beds or Cultivation Tanks, (a) Upward Flow, (b) Lateral Flow. The Oxidation of Sewage.—The Scientific Principles Involved. Nitrification. The Essentials of a Sewage Filter. Contact Beds v. Continuous Filters. Contact Beds Contrasted with Percolating Filters.—Varieties of Contact Beds. Varieties of Filters. Different Methods of Applying Sewage. Varieties of Sewage Distributors. Size of Particles of Filtering Medium. Advantages of Contact Beds. Advantages of Filters. No Necessity for Prolonged Contact. Automatic Appliances for Working Contact Beds and Filters. Chesterfield Experiments. Intermittent Sprays. Revolving Distributors. Stoddart's Distributor. Results. Relative Merits of Different Bacterial Processes. Conditions Indicating What Process should be adopted to meet local circumstances.

SEE ALSO OTHER PAGES

The above books and those referred to on other pages are selected as the very best and most up-to-date. We will supply promptly at regular price any book in print.

MUNICIPAL JOURNAL PUBLISHING CO., 140 Nassau St., New York

SOME OF THE VERY BEST BOOKS RELATING TO MUNICIPAL and PUBLIC WORKS

NOTES ON ELECTRIC RAILWAY ECONOMICS AND PRELIMINARY ENGINEERING.—A Series of Notes on the Preliminary Engineering of Interurban Electric Railways. By W. C. Gotshall. Second Edition. 251 pages, 11 plates. Price, $2.00 net.

CONTENTS.—Preliminary Office Determinations. Preliminary Field Survey. Detailed Office Investigation of Track Location. Preliminary Determination of Schedules and Equipment. Estimate of Earnings. Estimate of Probable Operating Expenses. The Final Survey. Track Construction. Overhead or Third Rail Construction. The Power Station. Storage Batteries. Rolling Stock and Motors. Securing Rights of Way. Preparation of the Specifications. The Construction Period. The Organization of Operating Department. Economic Considerations. Specifications for Moderate Size Interurban Railway. Bibliography.

THE ART OF ILLUMINATION.—A Treatise Dealing with Scientific as well as Artistic Use of Modern Illuminants. By Louis Bell, Ph. D. 339 pages, 127 illustrations. Price, $2.50 net.

CONTENTS.—Light and the Eye. Principles of Color. Reflection and Diffusion. The Materials of Illumination. Illuminants of Combustion. Incandescent Burners. The Electric Incandescent Lamp. The Electric Arc Lamp. Shades and Reflectors. Domestic Illumination. Lighting Large Interiors. Street and Exterior Illumination. Scenic and Decorative Illumination. The Illumination of the Future. The Elements of Photometry.

AMERICAN TELEPHONE PRACTICE.—A Comprehensive Treatise, Including Descriptions of Apparatus, Line Construction, Exchange Operation, etc. By Kempster B. Miller. Fourth edition entirely rewritten and greatly extended. 904 pages, 643 illustrations. Price, $4.00 net.

REINFORCED CONCRETE.—By A. Considère. Translated from the French, with a Preface and Additions by Leon S. Moisseiff. 188 pages, 20 figures. Price, $2.00 net.

This book contains the results and discussions of the series of tests on reinforced concrete conducted by A. Considère. These tests have completely changed the views held on the subject and have become the basis for many theoretical deductions and still more practical applications. The results of these tests have here been, for the first time, collected and arranged so as to present to the engineer a consecutive statement.

CONTENTS.—Reinforced Concrete in Bending. The Deformation and Testing of Reinforced Concrete Beams. Effects on Changes in Volume of Concrete. Tensile and Compressive Resistance of Reinforced Concrete. Resistance of Concrete to Shearing and Sliding. Effects of Cracks on Stresses and Deformations. The Compressive Resistance of Reinforced and Hooped Concrete.

SOME DETAILS OF WATER-WORKS CONSTRUCTION.—By W. R. Billings. 96 pages, 28 illustrations. Price, $2.00 net.

CONTENTS. — Main Pipes.—Materials. Cast-Iron, Cement-Lined Wrought Iron, Salt-Glazed Clay. Thickness of Sheet Metal. Methods of Lining. List of Tools. Tool Box. Derrick. Calking Tools. Furnace. Transportation. Handling Pipe. Cost of Carting. Distributing Pipe. II.—Field Work—Engineering or None. Pipe Plans. Special Pipe. Laying Out a Line. Width and Depth of Trench. Time-Keeping Book. Disposition of Dirt. Tunneling. Sheet Piling. III.—Trenching and Pipe-Laying. Caving. Tunneling. Bell Holes. Stony Trenches. Feathers and Wedges. Blasting. Rocks and Water. Laying Cast-Iron Pipe. Derrick Gang. Handling the Derrick. Skids. Obstructions Left in Pipes. Laying Pipe in Quicksand. Cutting Pipe. IV.—Pipe-Laying and Joint-Making. Laying Cement-Lined Pipe. "Mud" Bell and Spigot. Yarn. Lead. Jointers. Roll. Calking. Strength of Joints. Quantity of Lead. V.—Hydrants, Gates and Specials. VI.—Service Pipes—Definition. Materials. Lead *vs.* Wrought-Iron. Tapping Mains for Services. Different Joints. Compression Union. Cup. VII.—Service-Pipes and Meters—Wiped Joints and Cup-Joints. The Lawrence Air-Pump. Wire-Drawn Solder. Weight of Lead Service-Pipe. Tapping Wrought-Iron Mains. Service-Boxes. Meters. VIII.—Notes on the Construction of About Two Miles of 16-inch Water Main. IX.—Tables of Cost. Weight of Water Pipe. Cost of Close Sheeting per 100 feet. Cost of Brick Masonry in Egg-shaped Conduits; in Circular Conduits.

WATER-WORKS FOR SMALL CITIES AND TOWNS.—Describing the methods of construction of the various portions of a water-works plant. By John Goodell. 281 pages, 53 illustrations. Price, $2.00 net.

CONTENTS.—Surface Water. Earth Dams. Minor Details of Reservoirs. Timber Dams. Masonry Dams. Special Features of River and Pond Supplies. Ground-Water Supplies. The Utilization of Springs. Open Wells. Driven Wells. Deep and Artesian Wells. Pumps. The Air Lift. Pumping Stations. Intakes and Intake Pipes. Clarification and Purification of Water. The Pipe System. Service Reservoirs and Stand Pipes. The Quantity of Water to be Provided. The Water-Works Department.

CEMENT AND CONCRETE.—A Treatise Designed Especially for American Engineers, Covering the Manufacture, Properties and Testing of Cement, and the Preparation and Use of Cement Mortars and Concretes. Special Attention is Given to the Costs of Cement and Concrete for Different Uses and Under Various Conditions. By Louis Carlton Sabin. 504 pages, 161 tables of tests. Price, $5.00 net.

CONTENTS.—Part I.—Cement: Classification and Manufacture. Definitions and Constituents. Manufacture. Part II.—Properties of Cement and Methods of Testing. Introductory. Chemical Tests. The Simpler Physical Tests. Sifting and Fine Grinding. Time of Setting and Soundness. Tests of the Strength of Cement in Compression, Adhesion, etc. Tensile Tests of Cohesion. Reception of Cement and Records of Tests. Part III.—The Preparation and Properties of Mortar and Concrete. Sand for Mortar. Mortar: Making and Cost. Concrete: Aggregates. Concrete Making: Methods and Cost. The Tensile and Adhesive Strength of Cement Mortars and the Effect of Variations in Treatment. Compressive Strength and Modulus of Elasticity of Mortar and Concrete. The Transverse Strength and other Properties of Mortar and Concrete. Part IV.—Use of Mortar and Concrete. Concrete Deposition. Concrete-Steel. Special Uses of Concrete. Buildings, Walks, Floors and Pavements. Sewers, Subways and Reservoirs. Bridges, Dams, Locks and Breakwaters.

CEMENT INDUSTRY, THE.—Description of Portland and Natural Cement Plants in the United States and Europe, with Notes on Materials and Processes in Portland Cement Manufacture. 235 pages, 132 illustrations. Price, $3.00 net.

CONTENTS.—Portland Cement—Sketch of Materials and Process. The Portland Cement Plant of the Coplay Cement Co., the Bronson Portland Cement Co., the Empire Portland Cement Co., the Buckeye Portland Cement Co., Western Portland Cement Co., the Michigan Portland Cement Co., the Nazareth Portland Cement Co., the Vulcanite Portland Cement Co., the William Krause & Sons Cement Co., the Lawrence Cement Co., the Virginia Portland Cement Co., the Whitehall Portland Cement Co., the New York and Rosendale Cement Co., the Milwaukee Cement Co., the Natural Cement Co., the Maryland Cement Co., the American Rotary Kiln Process for Portland Cement. Plants in England, Belgium, Germany, and France.

ELECTRIC POWER TRANSMISSION.—A Complete Treatise on the Practical and Commercial Side of Electric Power Transmission. By Louis Bell, Ph. D. Third Edition. 632 pages, 285 illustrations, 21 plates. Price, $3.00 net.

CONTENTS.—Elementary Principles. General Condition of Power Transmissions. Power Transmission by Continuous Currents. Some Properties of Alternating Currents. Power Transmission by Alternating Currents. Synchronous and Induction Motors. Current Reorganizers. Engines and Boilers. Water Wheels. Hydraulic Development. The Organization of a Power Station. The Line. Line Construction. Centers of Distribution. The Commercial Problem. The Measurement of Electrical Energy. The Present Status of High-Voltage Transmission.

EXPERIMENTAL RESEARCHES UPON THE CONSTITUTION OF HYDRAULIC MORTARS.—By H. Le Chatelier. Authorized Translation from the French by J. L. Mack. 128 pages. Price, $2.00 net.

This essay stands as the first and most complete piece of work upon the Chemistry of Portland Cement, and has been the starting point of numerous recent studies. The author has corrected the manuscript and indicated the most important advances in theoretical knowledge.

CONTENTS.—Introduction, Historical. The Calcination of Plaster. The Set of Plaster. The Chemical Phenomena of Hydration. The Physical Phenomena of Crystallization. The Mechanical Phenomena of Hardening. The Synthetic Study of the Barium Silicates. Barium Cement. Air Mortars. The Calcination of Lime. Hydraulic Mortars. Classification. Historical Researches. Synthetic Study of the Calcium Salts. Lime, Calcium Hydrates. Calcium Silicates. Calcium Aluminates. Calcium Ferrites. Microchemical Study of Cements. Anhydrous Cements. Hydrated Cements. The Manufacture and Use of Cement. The Composition and Calcination. The Set and Hardening. The Causes of Destruction of Hydraulic Mortars. The Methods of Testing. Index.

A TREATISE ON MASONRY CONSTRUCTION.—By Ira O. Baker, Professor of Civil Engineering, University of Illinois. Ninth Edition, Extensively Revised. 8vo, about 600 pages, 160 figures and 6 folding plates. Cloth, $5.00.

CONTENTS.—Containing Materials and Methods of Testing Strength, etc. Combinations of Materials—Composition, etc. Foundations—Testing the Bearing Power of Soils, etc. Masonry Structure—Stability Against Sliding, Overturning, Crushing, etc., etc., etc.

SEE ALSO OTHER PAGES

The above books and those referred to on other pages are selected as the very best and most up-to-date. We will supply promptly at regular price any book in print.

MUNICIPAL JOURNAL PUBLISHING CO., 140 Nassau St., New York

SOME OF THE VERY BEST BOOKS RELATING TO MUNICIPAL and PUBLIC WORKS

STREET PAVEMENTS AND PAVING MATERIALS.—A Manual of City Pavements: the Methods and Materials of their Construction. For the Use of Students, Engineers, and City Officials. By Geo. W. Tillson, C. E. 8vo, xii + 532 pages, 60 figures. Cloth, $4.00.

CONTENTS.—The History and Development of Pavements. Stone. Asphalt. Brick-clays and the Manufacture of Paving-brick. Cement, Cement Mortar, and Concrete. The Theory of Pavements. Cobble and Stone-block Pavements. Asphalt Pavements. Brick Pavements. Wood Pavements. Broken-stone Pavements. Plans and Specifications. The Construction of Street-car Tracks in Paved Streets. Width of Streets and Roadways, Curbs, Sidewalks, etc. Asphalt Plants.

A TREATISE ON ROADS AND PAVEMENTS.—By Ira Osborn Baker, C. E. 8vo, viii + 655 pages, 171 figures, 68 tables. Cloth, $5.00.

CONTENTS.—Introduction. Part I.—Country Roads. Road Economies. Road Location. Earth Roads. Gravel Roads. Broken-stone Roads. Miscellaneous Roads. Equestrian Roads and Horse-race Tracks. Part II.—Street Pavements. Pavement Economics. Street Design. Street Drainage. Curbs and Gutters. Pavement Foundations. Asphalt Pavements. Brick Pavements. Cobble-stone Pavement. Stone-block Pavement. Wood-block Pavements. Comparison of Pavements. Sidewalks. Bicycle Paths and Race Tracks.

THE MODERN ASPHALT PAVEMENT.—By Clifford Richardson. 8vo, 580 pages. Cloth, $3.00.

CONTENTS.—Introduction. Part I.—The Base and Intermediate Course. Part II.—The Materials Constituting the Asphalt Surface Mixture. Part III.—Native Bitumens in Use in the Paving Industry. Part IV.—Technology of the Paving Industry. Part V.—Handling of Binder and Surface Mixture on the Street. Part VI.—The Physical Properties of Asphalt Surfaces. Part VII.—Specifications for the Merits of Asphalt Pavement. Part VIII.—Causes of the Defects in and the Deterioration of Asphalt Surfaces. Part IX.—Control of Work.

HIGHWAY CONSTRUCTION.—A Treatise on Highway Construction, Designed as a Text-book and Work of Reference for All Who May be Engaged in the Location, Construction, or Maintenance of Roads, Streets, and Pavements. By A. T. Byrne, C. E. Fourth Revised and Enlarged Edition. 8vo, xl + 895 pages, 306 illustrations. Cloth, $5.00.

CONTENTS.—General Considerations Concerning Pavements, Pavement Economics, Materials Employed. Their Physical and Chemical Qualities. Advantages, Defects, Methods of Construction, and Cost of Stone, Wood, Asphaltum, Coal-tar, Brick, and Broken-stone Pavements. Gravel and Concrete Pavements. Stone Trackways. Plank and Log Roads. Foundations for Pavements, Necessity of. Materials Employed. Concrete. Manufacture and Laying. Quality of Cement. Method of Testing. Resistance to Traction. Effect of Grades. Character of Vehicles. Width of Tires. Size of Wheels. Location of Country Roads. General Considerations. Selection of Best Route. Grades. Width and Transverse Contour of Roads and Streets. Earthwork. Drainage and Culverts. Bridges. Retaining-walls. Protection-works. Tunnels. Fencing. City Streets. Footpaths. Curbs and Gutters. Materials Employed. Qualities Required. Methods of Construction. Reconstruction and Improvement of Country Roads. Value of Improvements. Maintenance. Repairing. Cleansing and Watering of Roads and Streeets. Methods of Executing. Cost of. Staking-out Work. Trees on Highways, Opinions Regarding. Qualities of. Specifications and Contracts. Tools and Machinery Employed in Construction and Maintenance. Miscellaneous Notes. Appendices on Naming and Numbering Country Roads and Houses. Methods of Assessing the Cost of Street Paving. Ordinance Regulating the Width of Wagon Tires. Cycle Paths.

INSPECTION OF THE MATERIALS AND WORKMANSHIP EMPLOYED IN CONSTRUCTION.—A Reference Book for the Use of Inspectors, Superintendents, and Others Engaged in the Construction of Public and Private Work, etc. By Austin T. Byrne, C. E. Second Edition. 16mo, xvi + 540 pages. Cloth, $3.00.

SEWER DESIGN.—By H. N. Ogden, C. E., Aso. M. Am. Soc. C. E. 12mo, xi + 234 pages, 54 figures, 5 plates. Cloth, $2.00.

CONTENTS.—General Considerations. Preparatory Maps and Data. Excessive Rains—proportion Reaching the Sewers. Relation of Density to Percentage. Mathematical Formulæ. Estimating Future Population. Amount of Sewage per Capita. Ground-water Reaching Sewers. Grades and Self-cleansing Velocities. Developments of Formulæ for Flow. Kutter's Formula. Sewer Diagrams. Use of Diagrams. Sewer Plans. Sewer Cross-sections. Flushing. Use of Tanks.

SEWERAGE.—The Designing, Construction, and Maintenance of Sewerage Systems. By A. Prescott Folwell, M. Am. Soc. C. E. Fifth Edition, Revised and Enlarged. 8vo, x + 455 pages, illustrated. Cloth, $3.00.

CONTENTS.—Part I.—Designing. System to be Employed. Sewage Disposal. Amount of Sewage. Flow in Sewers. Flushing and Ventilation. Collecting the Data. The Design. Detail Plans. Specifications, Contract, Estimate of Cost. Part II.—Construction. Preparing for Construction. Laying Out the Work. Oversight and Measurement of Work. Practical Sewer Construction. Part III.—Maintenance. House Connections and Drainage. Sewer Maintenance. The Sewage-treatment Problem. Prevention of Nuisance. Destruction. Tables.

HANDBOOK ON SANITATION.—A Manual of Theoretical and Practical Sanitation. For Students and Physicians; for Health, Sanitary, Tenement-house, Plumbing, Factory, Food, and Other Inspectors; as well as for Candidates for all Municipal Sanitary Positions. By George M. Price, M. D., Medical Sanitary Inspector, Department of Health, New York City, etc. 12mo, xii + 317 pages, 31 figures. Cloth, $1.50. Second Edition, Revised and Enlarged.

SEWAGE AND THE BACTERIAL PURIFICATION OF SEWAGE.—By Samuel Rideal, D. Sc. (Lond.). 8vo, viii + 278 pages, 47 figures. Cloth, $3.50.

CONTENTS.—Characters of Sewage, and Primary Methods of Disposal. Chemical Analysis of Sewage and Effluents. Bacteria Occurring in Sewage. Chemical Changes Produced by Bacteria. Irrigation and Sewage Farms. Subsidence and Chemical Precipitation. Sterilization. Bacterial Purification. Agricultural Value of Bacterial Effluents. Distribution and Distributors Trade Effluents.

THE ECONOMIC DISPOSAL OF TOWNS' REFUSE.—By W. Francis Goodrich, A. I. Mech. E. Demy 8vo, xvi + 340 pages, 75 illustrations. Cloth, $3.50. (English.)

CONTENTS.—The Evolution of the Refuse Destructor. Refuse Tipping. Refuse Sorting and Utilization. The Law as to Collection and Removal of Refuse. Its Scope and Definition as Applied to the Sanitary Authority and the Citizen. The Value of Towns' Refuse for Steam Raising. Slow versus Rapid Combustion. The Comparative Efficiency of Various Types of Steam-boilers for Destructor and Power Plants. Boiler Setting, Brickwork, and Flues. Chimneys and Draught Refuse Disposal in London Sanitary Districts. Refuse Disposal in the Great Towns of England and Wales. Progress in Refuse Destruction in the County Boroughs. Progress in Refuse Destruction in Incorporated Towns. Refuse Disposal in Urban District Councils of England and Wales, with Populations of 2,000 and Upwards. Refuse Disposal in Scotland. Refuse Disposal in Ireland. Refuse Disposal in America, with Introduction by Colonel W. F. Morse, of New York. Refuse Disposal in Europe. Refuse Disposal in South Africa. Refuse Disposal in India. Refuse Disposal in South America. Refuse Disposal in Australasia. Refuse Disposal in the East. Refuse Destructors Described. General Remarks.

WATER-SUPPLY ENGINEERING.—By A. Prescott Folwell. Second Edition, Revised and Enlarged. 8vo, xiv + 570 pages, illustrated with 95 figures and 19 full-page plates. Cloth, $4.00.

CONTENTS.—Designing. Synopsis. Requisites of a Supply—Quality. Requisites of a Supply—Quantity. Sources of Supply. Rainfall. Surface-water. Rivers and Lakes. Ground-water. Gravity Systems. Pumping Systems. Hydraulics. Dams and Embankments. Purification of Water. Pumping and Pumping-engines. Designing. Part II.—Construction. Supervision and Measurement of Work. Practical Construction. Part III.—Maintenance. Reservoirs. Headworks, and Intakes. Pumping-plants and Filters. Pipes and Conduits. Clerical and Commercial.

PUBLIC WATER-SUPPLIES.—By F. E. Turneaure, C. E., and H. L. Russell, Ph. D. With a Chapter on Pumping-machinery, by D. W. Mead, C. E., M. Am. Soc. C. E. 8vo, xiv + 746 pages, 231 figures. Cloth, $5.00.

CONTENTS.—Introduction. Part I.—Requirements and Resources. Quantity of Water Required. Sources of Supply. The Rainfall. Evaporation and Percolation. Flow of Streams. Ground-water. Examination of Water-supplies. Quality of Water. Communicable Diseases and Water-supplies. Part II.—The Construction of Water-works. Generalities Pertaining to Water-works Construction. Hydraulics. River and Lake Intakes. Works for the Collection of Ground-water. Impounding-reservoirs. Earthen Dams. Masonry Dams. Timber Dams. Steel Dams. Loose-rock Dams. Objects and Methods of Purification. Sedimentation. Sand Filtration. Mechanical Filtration. Miscellaneous Purification Processes. Pipes for Conveying Water. Conduits and Pipe-lines. Pumping-machinery. Distributing and Equalizing Reservoirs. The Distributing System. Operation and Maintenance.

THE DESIGN AND CONSTRUCTION OF DAMS.—By Edward Wegmann, C. E., M. Am. Soc. C. E. Fourth Edition, Revised and Enlarged. 4to, xii + 250 pages, profusely illustrated with 75 figures in the text and 97 plates, including folders and half-tones. Cloth, $5.00. Masonry, Earth, Rock-fill, and Timber Structures; also the Principal Types of Movable Dams.

A TREATISE ON CONCRETE, PLAIN AND REINFORCED.—By F. W. Taylor, M. E., and Sanford Thompson, Assoc. M. Am. Soc. C. E., with Chapters by R. Feret, W. B. Fuller and S. B. Newberry. 8vo, xxxv + 585 pages, 176 figures. Cloth, $5.00. Materials, Construction and Design of Concrete and Reinforced Concrete.

SEE ALSO OTHER PAGES

The above books and those referred to on other pages are selected as the very best and most up-to-date. We will supply promptly at regular price any book in print.

MUNICIPAL JOURNAL PUBLISHING CO., 140 Nassau St., New York

UNIVERSAL ROLLERS

TWO-WHEEL ROLLERS—SIZES 3 TO 12 TONS

Received Gold Medal, Highest Award —World's Fair

THREE-WHEEL ROLLERS

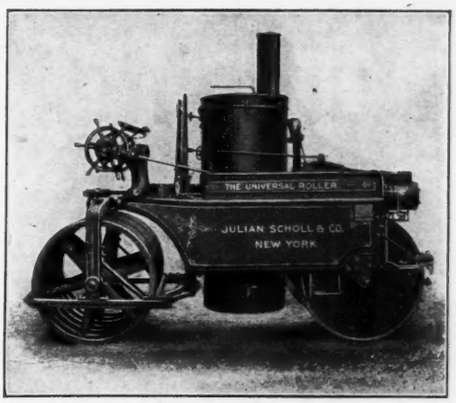
WITH COMPENSATING GEAR

10, 12 AND 15 TON SIZES

Send for Catalogues to

JULIAN SCHOLL & CO.

NEW YORK, 126 Liberty Street
CHICAGO, Old Colony Building



ERIE MACHINE SHOPS

P. W. DIETLY, Proprietor

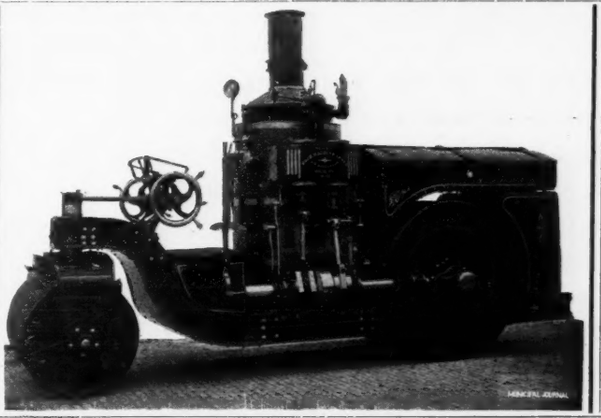
ERIE, PA.

This is an Illustration of

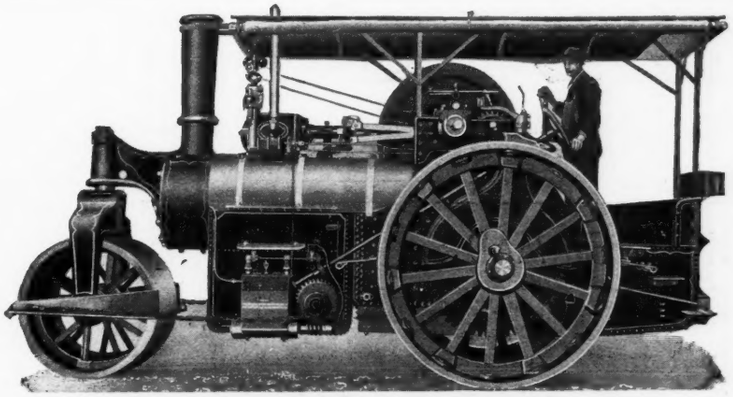
Our 20th Century Roller

Send for Catalogue of Rollers and Mixers

New York Agency Continental Ry. Equipment Co.
42 BROADWAY



ERIE
ERIE
ERIE
ERIE
ERIE
ERIE



SPRINGFIELD Steam Road Rollers

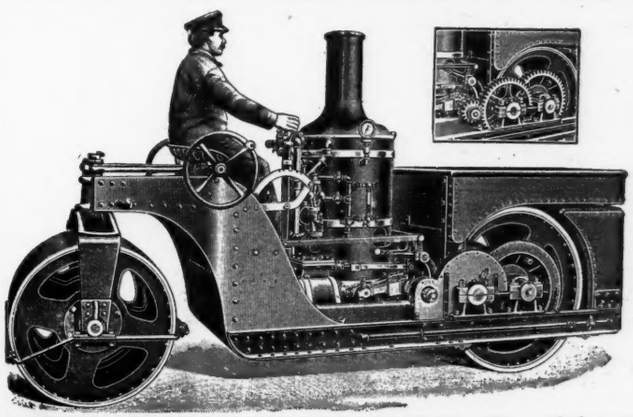
ALL KINDS ALL SIZES

MADE BY

THE KELLY-SPRINGFIELD ROAD ROLLER CO.

SPRINGFIELD, OHIO, U. S. A.

Send for Catalogue.



Buffalo Pitts Double Engine Steam Road Roller

FOR CATALOGUE AND ESTIMATES WRITE

BUFFALO STEAM ROLLER CO.
Buffalo, N. Y., U. S. A.

"All Buffalo Pitts Machinery is Standard"

Dumping Wagons That Dump

The claims made for many wagons cannot be substantiated—experience teaches that fact—expensive education for you.

BUY A WATSON

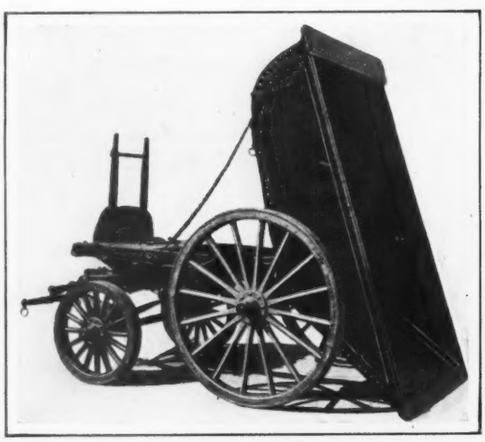
Original and still the best. Built of the best materials, built on tested lines—not an experiment. Does the work needed day after day and year after year—no big repair bills. Bottom opens full size of box, and the load dumps quickly, clean, without stopping the team. Dumps out every atom that goes in and dumps every opposition argument at same time.

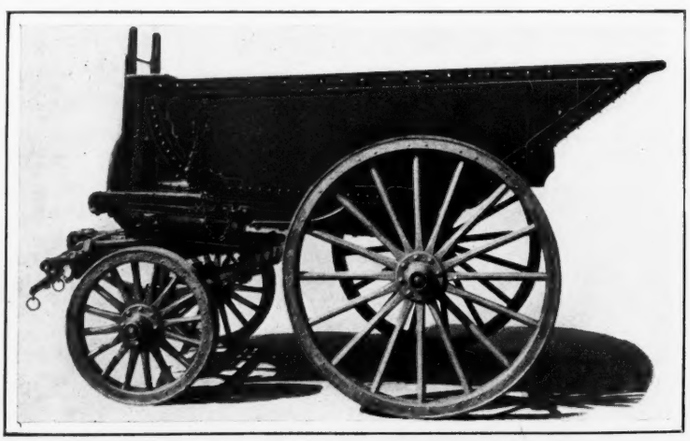
WATSON WAGON CO., Cor. Center and Buck Sts., Canastota, N.Y.

HILL'S

Patent Steel Sanitary Dumping Wagons and Carts

ARE THE BEST MADE



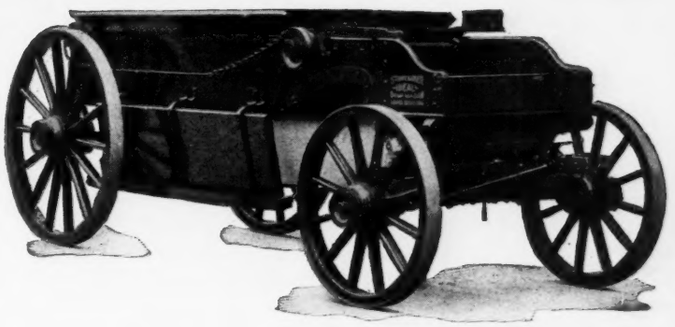


This cart is specially designed for carrying sewage and liquid garbage. We will show cuts of other wagons in subsequent issues.

Hill Cart and Wagon Works, JERSEY CITY, N. J.
THOS. HILL, - Proprietor

STUDEBAKER

"IDEAL"



Has simplest dumping attachments (all on outside), of any wagon on market. For hauling

Brick, Gravel, Cobblestone, Wet or Dry Asphalt, Macadam,

and spreading crushed stone.

Not a Single Obstruction on Inside of Bed

The Studebaker "**Ideal**" is the most advanced type of dump wagon made. **Light Weight, Quick in Action.** Furnished in wide or narrow track.

STUDEBAKER BROS. MFG. CO., South Bend, Ind.

Manufacturers **Wagons, Sprinklers, Sweepers, Carriages and Harness**
Also **Gasoline Touring Cars and Electric Automobiles for every purpose**

NEW YORK BRANCH:
Broadway and 7th Ave. at 48th St.

Branches also at Chicago, Kansas City, Dallas, Denver, Salt Lake City, San Francisco, Portland, Ore.

The Troy Bottom-Dump Wagon

SIMPLE
STRONG
SERVICEABLE

Inside of box absolutely clear

Manufactured by

The TROY WAGON WORKS CO.
TROY, - - OHIO

This style for municipal work. Other styles for general contracting purposes. TROY Bottom-Dump Wagons are made with steel axles; 3 or 4 inch tires; bottom of reinforced steel plates, one overlapping the other, so that there can be no leakage of load; 1 1-2 to 5 yards capacity. Guaranteed against defective material or workmanship. Full description and price on request.

A Dump Wagon

THAT CANNOT STALL

TIGHT JOINTS TOO

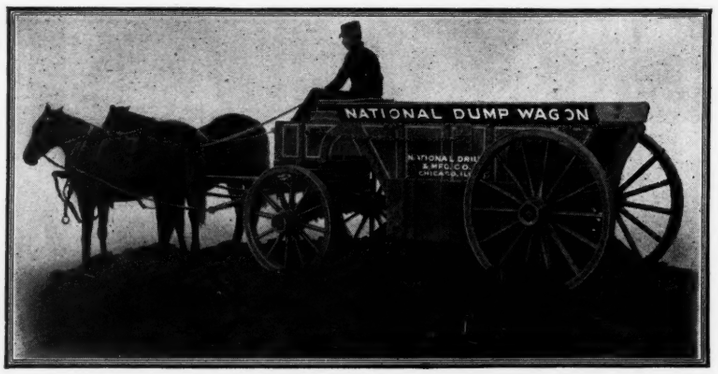
SEE THAT LOOP!

EASY TO LOAD
EASY TO DUMP
EASY TO HAUL
EASY TO CLOSE

Let Us Tell You About It

NATIONAL DRILL & MFG. CO.

PULLMAN BUILDING, CHICAGO



THE NATIONAL DUMP WAGON. Pat. Aug. 11, 1903.

JOSIAH F. DAY GARBAGE WAGON

We show here the best Garbage Wagon on the market, especially adapted for handling of ashes, refuse, etc., in cities and towns.

THIS SHOWS WAGON READY TO LOAD

Built in 2-yd., 3-yd. and 4-yd. capacity. We also are building this style wagon for Contractors' use, as well as a full line of Contractors' Carts and Wagons.

Write us for prices and terms and special catalog.

COLUMBIA WAGON CO.

COLUMBIA, PA., U. S. A.

Haywood Sanitary Wet Garbage Wagon.

Wagons and Carts for Every Purpose

Municipal officials and public contractors will find their requirements in the cart and wagon line best suited in the varied product of the Haywood Wagon Co., manufacturers of the most serviceable types for every kind of work. Skilled workmen, the best materials, and expert supervision, unite in turning out wagons which are most highly commended by users everywhere.

You will find our catalogue and prices of interest. Send for them.

Haywood Wagon Co., Baldwinsville, N. Y.

Are You Next? Having established it firmly in Greater New York, we now desire to push it elsewhere, and should like to put you "next" to THE SHADBOLT NEW

PATENT DUMPING WAGON FOR CONTRACTORS AND MUNICIPAL USE

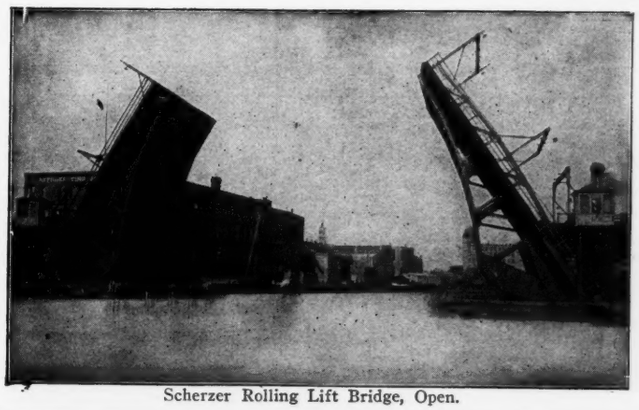
THE SHADBOLT NEW Patent Dumping Wagons are telling their own story, and are saying: The body slides back on the frame and dumps without rack or pinion; it is *not possible* for the crank to be forced from hands and injure operator; body can be brought back into position, after dumping by one man very easily; load properly distributed over both axles ensuring easiest possible draft; there are no rollers or wheels to wear flat; the Shadbolt is well built, strong, simple, and in durability as well as in economy and convenience of repairs will show up well.

Although this wagon is only one year young, it is backed by 50 years' experience and reputation in building "vehicles for handling merchandise." Its gratifying sales in its first year in Greater New York have come from demonstration of actual performance of real work.

CRANFORD CO., leading contractors, now building Subway in Brooklyn, say: "For eight years past we have used Shadbolt vehicles, standard and special styles, and they have always 'made good,' filling the bill and standing the racket. Our opinion, in a nutshell, of the new dumper is: Perfectly simple and simply perfect." The "Engineering News," describing the New York Subway construction, said: "Various kinds of wagons were used, but particular success was had with the Shadbolt Dumping Wagon." Special wagons also for special purposes. Particular attention is called to our design for **BRICK.**

Our designs for handling **GARBAGE** and **ASPHALT** have given great satisfaction.

SHADBOLT MFG. CO., BROOKLYN, N. Y. 68 to 78 Flushing Avenue, and 1 to 15 Cumberland Street.



Scherzer Rolling Lift Bridge, Open.

"CENTER-PIER SWING BRIDGES form Artificial Obstructions, Destroying Navigation, and are being CONDEMNED, REMOVED and REPLACED by modern SCHERZER ROLLING LIFT BRIDGES wherever Manufactures, Commerce, Transportation and Ships are Valued, Protected and Advanced."

WRITE US FOR INFORMATION

The Scherzer Rolling Lift Bridge Co.

Main Offices: MONADNOCK BLOCK, CHICAGO, U. S. A.

ATLANTIC, GULF & PACIFIC CO.

Engineers and Contractors

Hydraulic Dredge discharging through 6,170 feet of pipe.

Correspondence Solicited

MAIN OFFICE
Park Row Building
NEW YORK

Specialties { Dredging, Dredging Machines
Land Reclamation, Docks
Piers, Foundations, Bridges

BRANCH OFFICES
220 Market St., San Francisco
95 Yesler Way, Seattle, Wash.
Manila, Philippine Islands

PROFESSIONAL OPINIONS

LONDON, ONT., JAN. 24, 1904.

I am satisfied that the Bitulithic pavement on Talbot Street, which was put down some two years ago by the Warren Company, is one of the best, and in fact cannot be beaten.

W. MAGEE,
Western University Medical Dept.

LONDON, ONT., JAN. 30, 1904.

We have had the Warren Bitulithic pavement on Talbot Street for nearly two years. It has given good satisfaction. There has been no cause for complaint in any way.

I believe it to be a first-class pavement.

W. E. WAUGH, M. D.

Correspondence Solicited from all parts of Canada.

The Warren Bituminous Paving Company.

OF ONTARIO, LTD.

HEAD OFFICE:
164 BAY STREET,
TORONTO, ONT.

BRANCH OFFICE:
OXFORD & TALBOT STREETS.
LONDON, ONT.

Nashville Roofing and Paving Co.

Contractors for
ROOFING AND PAVING

Warren's Bitulithic
(REGISTERED TRADE MARK)
Pavement

CEMENT FLOORS
GRANITOID SIDEWALKS

CONCRETE CONSTRUCTION

Home Office
811-817 N. Cherry Street
NASHVILLE, TENN.

THE EAST OHIO SEWER PIPE COMPANY
MANUFACTURERS OF
SEWER PIPE AND OTHER CLAY PRODUCTS
IRONDALE, OHIO.
Double Strength Culvert Pipe
15 inches to 36 inches.
For Deep Sewers and Water Conduits.
ALSO
Standard Ohio Sewer Pipe
3 to 36 inches, with standard deep and wide sockets, in 2 ft., 2½ ft. and 3 ft. lengths.
Flue Linings
Wall Copings
PAVING BRICK
Fire Brick
Fire Clay
ELECTRIC CONDUITS
and all other clay products.
ANNUAL CAPACITY
5,000 CARLOADS

ROBINSON CLAY PRODUCT CO.
AKRON, O.

7 PLANTS
Capacity 1000 Cars per Month

Branches

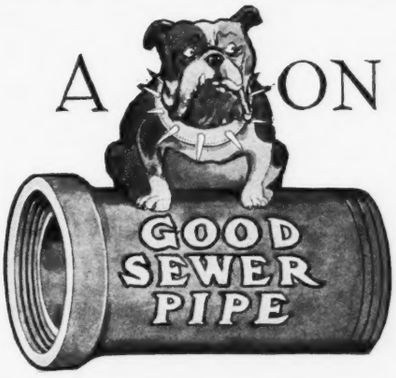
Flat Iron Building, New York
Eastern Clay Goods Co.
P. O. Square Bld'g, Poston
N. A. Williams Co.
Chamber of Commerce, Chicago

PAVING BRICK **PORTLAND CEMENTS**

FLINT BRICK & COAL CO.
Paving, Sidewalk, Sewer & Building Brick
DES MOINES, - - IOWA

Albanien and Hungarian Asphalt
HUNGARIAN-DERNA ASPHALT CO.
620 Hammond Building, - - DETROIT, MICH.

Ductility much more than any other.
Par excellence for durability, not affected by water.
Agency United States and Canada.



Under One Management C. M. STRATTON, H. E STRATTON
The STRATTON FIRE CLAY CO.
AND
The Ohio River Sewer Pipe Co.
MANUFACTURERS OF
HIGH GRADE SEWER PIPE
EMPIRE, ... OHIO
The Largest and Best Equipped Plants in the World
NOT IDENTIFIED WITH ANY TRUST

JAMES JONES, Chairman
JOHN H. JONES, President
DAVID G. JONES, Vice-President and General Manager
WILLIAM I. JONES, Secretary and Treasurer

PITTSBURG-BUFFALO COMPANY

GENERAL OFFICES, FRICK BUILDING, PITTSBURG, PA.

Miners, Manufacturers and Shippers of Coal and Coke

AND

STANDARD VITRIFIED WIRE CUT AND REPRESSED BEVEL EDGE PAVING BRICK AND PAVING BLOCK

SIDEWALK BRICK WIRE CUT AND REPRESSED MOTTLED BUILDING BRICK MILL BRICK

SALT GLAZED VITRIFIED SEWER PIPE VITRIFIED HOLLOW BUILDING BLOCK

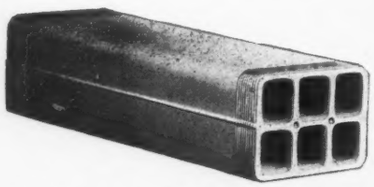
SALES AGENCIES:

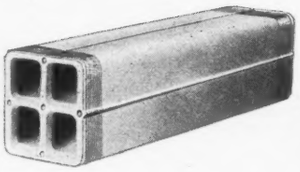
PITTSBURG & BUFFALO COMPANY, 842 Prudential Bldg., Buffalo, N. Y.
PITTSBURG & BUFFALO COMPANY, New England Bldg., Cleveland, O.
GEO. T. GETZ, Agent, 1560 Old Colony Bldg., Chicago, Ill.

OWNERS OF INDIVIDUAL CARS

Capacity of Brick, Ten Million Annually **Capacity of Sewer Pipe, Five Thousand Feet Daily**

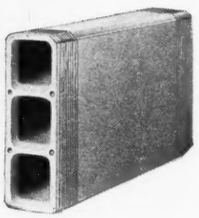
A Succession of Conduits

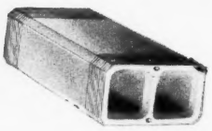




Each one as good as the others

For all are the best that can be made





Rochester Vitrified Clay Conduits are always up to standard. Wide experience, intelligent labor, and material of the highest quality, enable us to offer a superior product

STANDARD SEWER PIPE CO., ROCHESTER, N. Y.

A Perfect Paver for "T" Rails

Repressed Vitrified Brick Blocks

They satisfy the public! They give the Street Railway Companies an opportunity to lay the T-Rail through city streets.

WRITE FOR PRICES

W. H. ARTHUR, ∴ Stamford, Conn.

THOMAS HAMPTON, Gen'l Sup't. I. W. BRISON, Sales Agent

Laying Federal Clay Products Company Brick, Hayes, Pa.

FEDERAL CLAY PRODUCTS CO.

232 Fifth Avenue, PITTSBURG, Pa.

MANUFACTURERS OF

Paving Brick AND Block

Building, Tunnel and Sewer Brick

Sewer Pipes, Hollow Building Block

Electric Wire Conduits

WM. E. DEE CO.,

Manufacturers of

Vitrified Sewer Pipe,

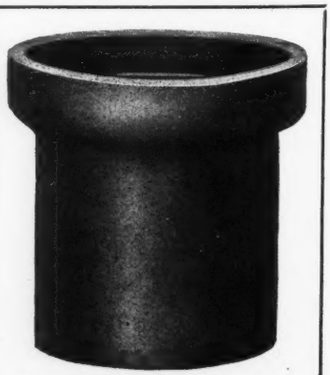
Drain Tile

Wall Coping

Flue Lining

Fire Brick

and Clay



Largest Output in the West

TWO PLANTS

Office

214-215 Royal Insurance Building
CHICACO

Works

Mecca, Parke County
INDIANA

Vitrified Paving Brick and Block Repressed and Wire Cut

HARPER NORTON SHALE BRICK CO.,
Conneaut, Ohio

TEXAS & PACIFIC COAL COMPANY,

Miners of Coal and Manufacturers of

THURBER STREET PAVING BRICK,

BUILDING BRICK AND SIDEWALK TILE.

Our Vitrified Paving Brick is equal to any manufactured in the country and Contractors and Architects specify Thurber Building Brick as a standard.

Prices and samples mailed on application. Correspondence respectfully solicited.

Address ARTHUR S. GOETZ, General Sales Agent, Ft. Worth, Texas.

Front Brick, Wire Cut and Repressed Vitrified Shale Paving and Tunnel Brick

MODERN MACHINERY and METHODS

FACE BRICK

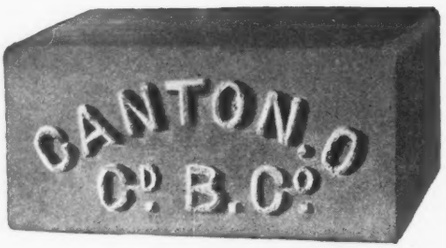
Buffalo Clay Manufacturing Co.

Works, Orchard Park, N. Y. Office, 41 Franklin St., Buffalo, N. Y.

The CLEVELAND BRICK CO.

MANUFACTURERS OF

Vitrified Shale Paving Brick and Block



211 West Fourth St. CANTON, O.

1400 Superior St. CLEVELAND, O.

SUBURBAN BRICK COMPANY

MANUFACTURERS OF

Barnard Vitrified Paving Brick and Blocks

WHEELING, W. VA.

THE BARR CLAY COMPANY

MANUFACTURERS OF

PAVING BRICK

STREATOR, ILL.

Standard Firebrick Co.

MANUFACTURERS OF

Firebrick and Fire Clay

PAVING BRICK AND BLOCKS

Annual Production 30,000,000 Brick and Block

75,000 Tons Ground and Flaked Clay

Office: Empire Bldg., Pittsburg, Pa.

WORKS:

Empire, Ohio. Irondale, Ohio. Globe, W. Va.

Collinwood Shale Brick Co.

MANUFACTURERS OF

COLLINWOOD

PAVING BRICK and BLOCK

AND

VITRIFIED SEWER BRICK

OFFICE: 854 ROSE BLDG., CLEVELAND, O.

PLANT: COLLINWOOD, O.

Western Brick Company

DANVILLE, ILLINOIS

Street Paving, Sewer and Impervious Red Building Brick

CAPACITY, SIXTY MILLION ANNUALLY

FIVE RAILROADS

THE

CLEARFIELD CLAY WORKING CO.

Manufacturers of

"CLEARFIELD VITRIFIED PAVING BLOCK"

VITRIFIED BRICK OF ALL KINDS

CLEARFIELD, PENN'A.

T. B. McAVOY
President and Treasurer

J. C. McAVOY
Secretary and General Manager

THE McAVOY VITRIFIED BRICK CO.

MANUFACTURERS OF

Shale Paving Brick and Blocks

Office: German-American Bldg., Philadelphia

Works: Perkiomen Junction, Pa.

BRICK, *VITRIFIED . . and COMMON,*

FOR

Paving, Sewers, Public Bldgs.

AND

General Contractors.

Prices and Samples Furnished on Application.

The Alton Paving, Building and Fire Brick Co. . . .

ALTON, ILL.

THE BEST PAVING BLOCK MADE

FOUR FACTORIES
DAILY OUTPUT
300,000

THE METROPOLITAN PAVING BRICK COMPANY
CANTON, - - - - OHIO

D. V. PURINGTON, President
C. H. CHAMBERLAIN, Treasurer

W. S. PURINGTON, Vice-President and General Manager

W. H. TERWILLIGER, Secret.
F. G. MATTESON, Sales Mgr.

PURINGTON PAVING BRICK COMPANY

GALESBURG, ILLINOIS

MANUFACTURERS OF THE **CELEBRATED PURINGTON BRICK**

Annual Capacity, 70,000,000

WRITE FOR SAMPLES, PRICES AND SUCH OTHER INFORMATION AS IS DESIRED

JOS. G. BUTLER, JR., Pres.

CHAS. M. CROOK, Gen. Mgr.

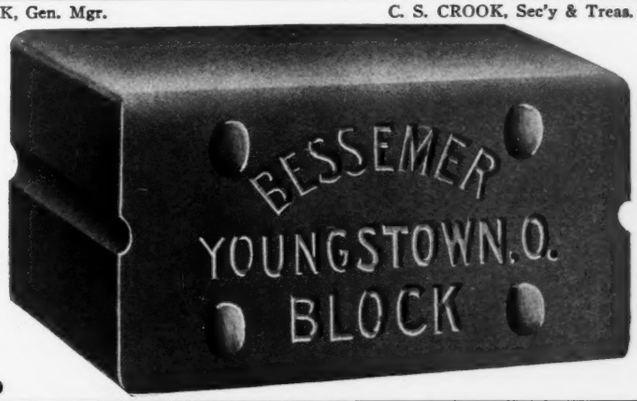
C. S. CROOK, Sec'y & Treas.

Bessemer Limestone Company

YOUNGSTOWN, OHIO

High Grade Paving, Sewer and Face
BRICK

Capacity **100,000** per Day
SCREENED LIMESTONE
Capacity **3000 tons** per Day



Municipal Officials

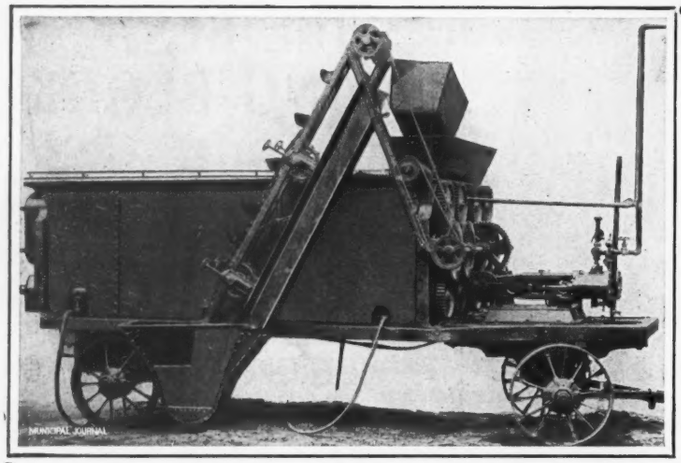
who want the best

BRICK PAVEMENT

should write us.

A FEW POINTS IN OUR FAVOR
Capacity 63,000,000 per annum
Largest plant east of Hudson River
PROMPT DELIVERIES
and all brick sold under a guarantee

New England Steam Brick Co.
WORKS: Barrington and Nayatt, R. I.
Providence, R. I.



KENTUCKY ROCK ASPHALT

brought to perfection by the use of this Machine, requiring no additional materials, which invention simplifies Asphalt Paving for new streets or repairing.

This method, on account of its simplicity and convenience, in connection with the quality of work secured, should appeal to every City Municipality.

It is portable and inexpensive. No so-called Experts are required.

Samples and additional information cheerfully furnished to Engineers and Contractors.

"Standard"

Kentucky Natural Rock Asphalt Mastic is positively superior to any foreign Rock Asphalt Mastic for Brewery or Stable floors, or where Water-tight floors are required.

The WADSWORTH STONE & PAVING COMPANY, Main Office, 405 Bessemer Building,

NEW YORK OFFICE, 32 Broadway. PITTSBURG, PA. MINES, PITTSBURG LANDING, Green River, Ky.

PLANTS

FOR THE MANUFACTURE OF

Asphalt Streets

THE HETHERINGTON

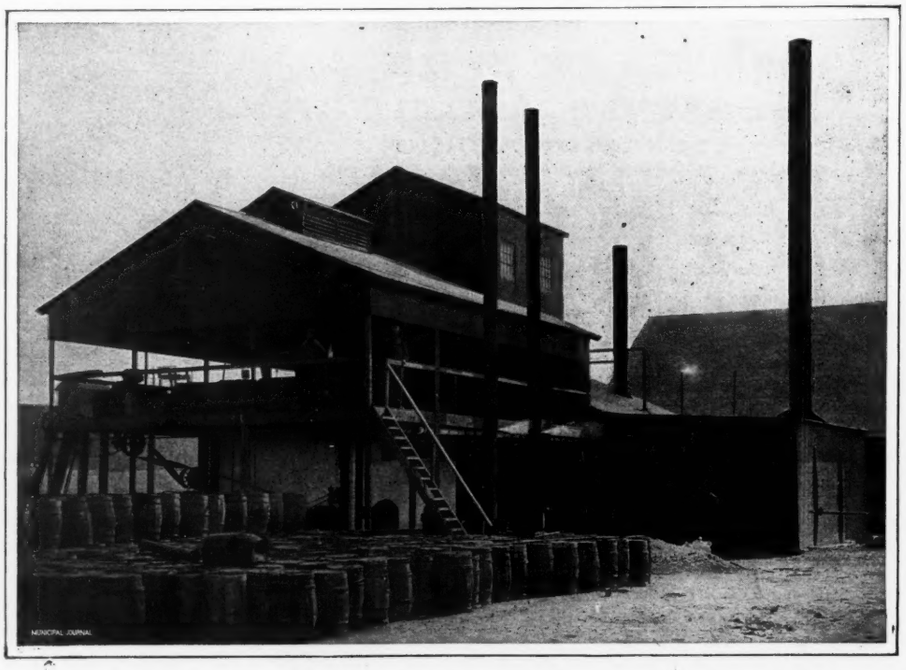
"Municipal,"

"Semi-Portable,"

AND

"Rail-way"

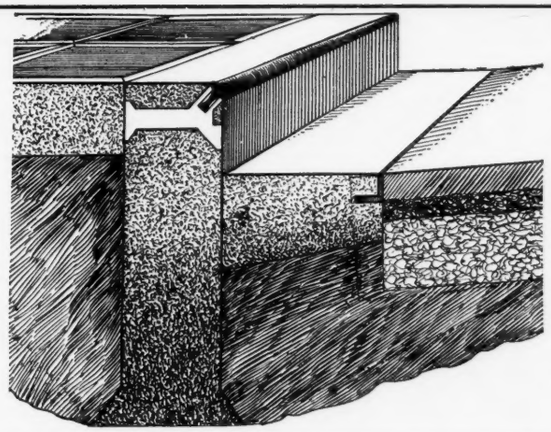
These plants have no equals and represent the latest and best methods.



THE "MUNICIPAL."

WE INSTALL PLANTS IN ANY PART OF THE WORLD, COMPLETE AND READY FOR SERVICE.

HETHERINGTON AND BERNER, Indianapolis, Indiana, U. S. A.



The Ideal Curb for Asphalt, Brick or Macadam Roadways

HANDSOME AND DURABLE

The Wainwright Steel-Bound Concrete Curb

AND COMBINED STEEL-BOUND CURB AND GUTTER 'PATENTED'

Absolutely non-breakable. Cheaper than granite and fully as strong.
Never requires re-setting or repairs.
Continuous in Construction, never out of line.
Galvanized Steel Corner Bar prevents chipping or breaking on edges.
Giving perfect satisfaction in over fifty cities in the U. S.
Correspondence Invited.

STEEL PROTECTED CONCRETE CO.
REAL ESTATE TRUST BUILDING, PHILADELPHIA, PA.

Warren's Acme High Grade 99 $\frac{0}{0}$ Pure Asphalt

Contains no soluble salts or dirt. Does not require admixture of still wax or paraffine oil, or bitumen of another class, to give it the proper consistency. Does not rot. Is a pure natural asphalt. Furnished in any degree of hardness as desired for any purpose.

Will Give Territorial Rights on Reasonable Terms. Laboratory Work, Expert Advice and Asphalt Paving Plants Furnished

Warren Asphalt Paving Co., Cambridge, Mass.

Capacity—
40,000 tons per year.

REFINERS OF

ANTI-TRUST

GLOBE ASPHALT CO.,

"OBISPO" BRAND

Over 200 Miles Pavement, laid since 1900.

99.6 per cent. Bitumen

CALIFORNIA ASPHALT LIQUID AND SOLID

ADDRESS ALL INQUIRIES
405 BLAKEWELL BUILDING, PITTSBURG, PA.

When about to Purchase or get Quotations Consult the Classified Business Directory on pages 11 and 13 or write to us for full information.

Municipal Journal and Engineer, 140 Nassau Street, New York

MECHANICAL DRYERS

WE MAKE THE LARGEST ASSORTMENT IN THE WORLD

Send for our Catalogue No. 15, of 337 Pages

THE C. O. BARTLETT & SNOW CO. CLEVELAND, OHIO.

BYERLEY & SON

CLEVELAND, OHIO

Manufacturers of the Celebrated

BYERLITE ASPHALT

The

Peerless Pavement

Kreodone Wood Block Pavements

are laid on the heaviest trafficked streets of America; are laid on the finest residence streets and the busiest business streets . . . .

Not a dollar has ever been spent for repairs on any

KREODONE WOOD BLOCK PAVEMENT

They have given universal satisfaction on all of them, being endorsed by Engineers, Municipal Authorities, Paving Contractors, Property Owners, Drivers and Automobilists. They are unequalled for durability, cleanliness, cheapness, safety, comfort, smoothness and ease of traction.

Republic Chemical & Creosoting Co.

Indianapolis, Indiana

PRODUCERS OF THE WORLD'S BEST PAVEMENTS

MURRAY STREET, NEW YORK

(CUT TAKEN FROM OUR NEW BOOKLET)

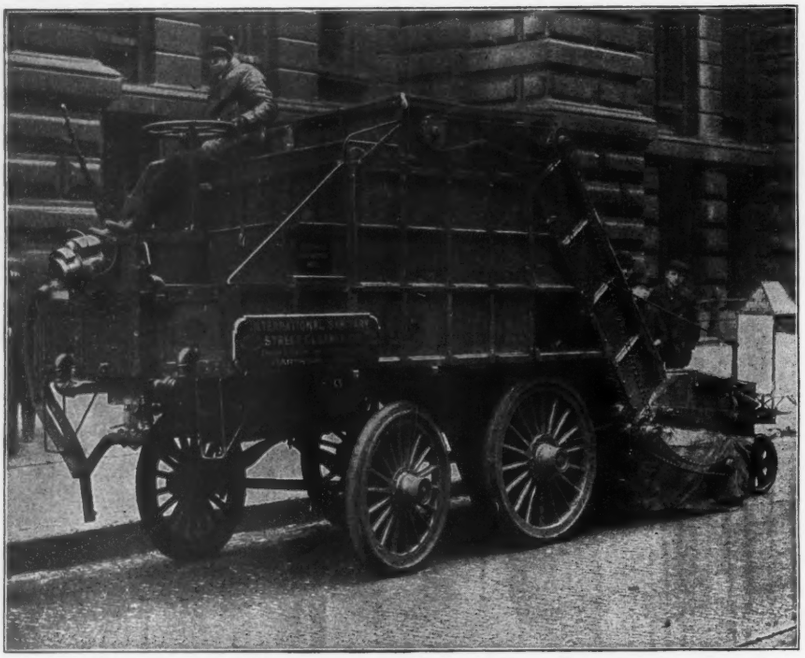
In New York U. S. Wood Blocks were subjected to the heaviest traffic tests in various down town streets of Manhattan Borough, and after trial and examination received the unqualified endorsement of the Chief Engineer of Highways, while business men and truck owners petitioned for extension of their use.

U. S. Wood Block Pavement is Smooth, Noiseless, Sanitary, easily cleaned, easily removed and replaced, non-slippery and even more durable than granite blocks.

BOOKLET SENT FREE ON REQUEST

United States Wood Preserving Co.

29 Broadway, New York City



Layman & Parpart Sanitary Street Sweeper Auto Machine Model 1905.
In operation on La Salle Street, Chicago, Ill.

THE

AMERICAN SANITATION COMPANY

OF

CHICAGO

ILLINOIS

Has purchased the sole right to use, or lease to others to be used, the entire line of the

LAYMAN & PARPART

SANITARY STREET CLEANING MACHINES, under U. S. patents, throughout the United States, and are now in position to bid for work on contract, or to lease machines to municipalities or contractors on terms which will enable them to do much better work than by any other method and at far less cost. The Company rents the machines only, and guarantees them to do the work stated in its catalogues. We invite correspondence with Municipalities, Improvement Associations, Boards of Health, Street Cleaning Contractors or others interested.

American Sanitation Company

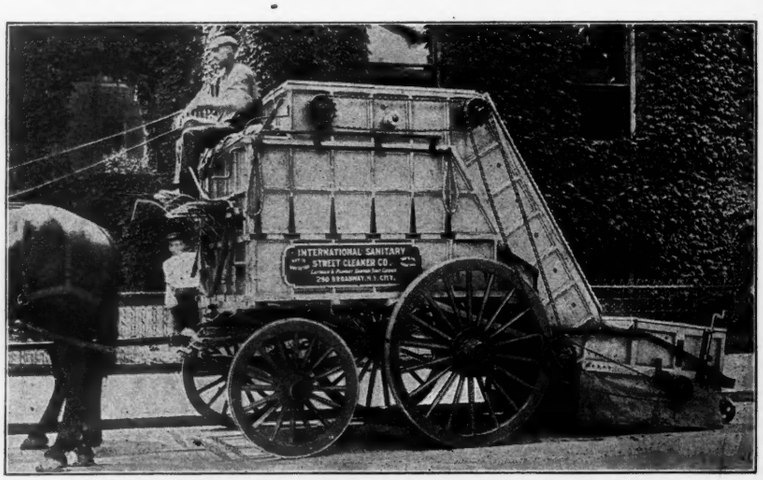
(INCORPORATED)

1330 First National Bank Building,

Dearborn and Monroe Streets

CHICAGO, ILL.

Telephone, Central 3493 **Auto. 6360**



Layman & Parpart Sanitary Street Sweeper Horse Machine Model 1904.
Shown in Operation on the Streets of Hartford, Conn.

6 GOOD REASONS

Why you should use

BITULITHIC PAVEMENTS

1—**Freedom from dust and mud.** *The surface can be sprinkled and kept free from dust.*

2—**Absence of Slippery Surface.** *When wet the surface has as good holding as a new macadam road.*

3—**Durability.** *It is made of particles of crushed stone of varying sizes in predetermined proportions to give the maximum density. The few remaining voids are completely filled, the mineral particles being firmly bound together with a bituminous cement which has been successfully used in pavements under traffic for 30 years. The combination forms a bituminous concrete, the durability of which depends upon the time required for traffic to wear out or abrade the stone—the most durable material known to nature.*

4—**Resiliency.** *Although the pavement is firm and non-wearing, it is not a "dead" surface.*

5—**Sanitary Advantages.** *Being waterproof, noxious substances thrown on the pavement cannot be absorbed.*

6—**Noiselessness.** *Horses' hoofs make but very little noise, vehicular traffic none at all.*

Send for Literature and Be Convinced

WARREN BROTHERS COMPANY

General Offices
93 Federal Street, Boston, Mass.

TRADE-MARKS

"Puritan" "Bitulithic" "Bitustone" "Bitrock" "Bituminous Macadam"

WATER METERS

YOU SHOULD STOP WASTING WATER - YOU CAN DO IT

IF YOU WILL USE HERSEY WATER METERS

MADE BY THE

NEW YORK COLUMBUS **HERSEY MFG. CO.** SOUTH BOSTON

Prevent Slipping

The Universal Safety Tread is the Positive Safeguard

For Stairs, Landings, Elevators, Steps, Sidewalks, and wherever a perfectly safe footing is desired.

Clean, Durable, Economical and Always Safe

THE Cities of Boston, Hartford and others have adopted the Universal Safety Tread for their public schools.

ARCHITECTS, Engineers and Builders everywhere say that this tread "makes slipping impossible."

Write for our Illustrated Booklet

UNIVERSAL SAFETY TREAD CO., 45 Broadway, NEW YORK

OKONITE — THE STANDARD FOR RUBBER INSULATION — OKONITE

Okonite Wires
Manson Tape

1889 PARIS EXPOSITION MEDAL
1893 WORLD'S FAIR MEDAL

WILLARD L. CANDEE, H. DURANT CHEEVER, Managers.

OKONITE TRADE MARK.

Okonite Tape
Candee Weather-Proof Wires

GEORGE T. MANSON, General Superintendent
W. H. HODGINS, Secretary

SOLE MANUFACTURERS

253 BROADWAY **THE OKONITE CO., LTD.** NEW YORK CITY

NEPTUNE METER COMPANY

MANUFACTURERS OF

"TRIDENT" and "TRIDENT-CREST" Water Meters

MAIN OFFICE
120 LIBERTY ST.
NEW YORK CITY
TELEPHONE
8292 CORTLANDT

FACTORY
LONG ISLAND CITY NEW YORK
TELEPHONE, NO. 960 GREENPOINT

BRANCH OFFICES
CHICAGO, 92 LA SALLE ST.
TELEPHONE, 679 MAIN
BOSTON 38 OLIVER ST.
TELEPHONE, 845 BROOKLINE
ATLANTA, 12 EQUITABLE BLDG.
SAN FRANCISCO, 212 MARKET ST

THE BERKELEY PRESS, 216-218 WILLIAM STREET, NEW YORK.